HELSINGIN KAUPPAKORKEAKOULU
Logistiikan aine

LOGISTICS OUTSOURCING: APPLICATION TO THIRD-PARTY LOGISTICS INDUSTRY

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HELSINGIN KAUPPAKORKEAKOULU
Markkinoinnin laitos / Logistiikan aine
Pro gradu -tutkielma
Miia Finne

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LOGISTIIKAN ULKOISTAMINEN: SOVELLUS TPL- TOIMIALALLA

Tutkielman tavoitteena oli vastata kysymykseen, tulisiko yrityksen ulkoistaa logistiset toimintonsa vai ei. Tavoitteeseen pyrittiin tutkielman teoriaosassa muodostamalla teoreettinen viitekehys ulkoistamisen päätöksentekoa varten. Tutkielman empiirisessä osassa teoreettista viitekehystä sovellettiin pikakuljetusyrityksen nouto- ja jakotoimintoihin ja saatujen tulosten pohjalta tehtiin toimenpidesuosituksia kohdeyritykselle.

Tutkielman teoriaosa perustuu aikaisempiin logistiikkaa, ydinosaamista ja ulkoistamista käsittelevään teoriakirjallisuuteen ja tieteellisiin tutkimuksiin. Empiirinen tutkimus perustuu lähtötilannehaastatteluihin, tutkimuksen yhteydessä tehtyihin haastatteluihin (14 kpl) ja kohdeyritystä käsitteleviin aikaisempiin tutkimuksiin. Lisäksi käytettiin tilastotietoja lähetysmääristä ja kustannuksista. Tutkielman teoreettinen osa toteutettiin kvalitatiivisena case-tutkimuksena. Empiirisessä osassa kohdeyrityksen kuvailussa käytettiin deskriptiivis-analyyttistä otetta ja muu osa toteutettiin normatiivisesti.

Logistiikan ulkoistamiseen vaikuttavat monet tekijät. Ulkoistamispäätöksen kannalta on tärkeää määritellä kriteerit, joilla eri vaihtoehtoja verrataan toisiinsa. Lopullista päätöstä varten tekijät voidaan painottaa niiden tärkeyden perusteella. Teoreettista viitekehystä käytettiin työn empiirisessä osassa analysoitaessa kohdeyrityksen nouto- ja jakotoimintojen ulkoistamista. Kohdeyritys käyttää tällä hetkellä sekä omia kuriireita että alihankkijoita ja työn empiirisen osan tavoitteena oli määritellä mitkä toiminnot tulisi jatkossakin ulkoistaa ja mitkä toteuttaa yrityksen sisällä. Työn empiirisessä osassa määriteltiin ensin lähtötilanne, tutkittiin nouto- ja jakotoimintojen suhdetta yrityksen ydinosaamiseen sekä määriteltiin vertailukriteerit.

Empiirinen osa jatkui analyysillä, jonka perusteella voitiin todeta, että nykyinen tilanne kohdeyrityksessä ei ole aivan optimaalinen. Yllättävä tulos oli, että alihankkija oli kaikilla tutkittavilla alueilla kustannustehokkaampi. Lisäksi kuitenkin todettiin, että alihankkijoiden palvelutaso oli usein merkittävästi omaa palvelutasoa alhaisempi. Kustannus- ja palvelutaso-analyysien perusteella kohdeyrityksen tulisi muuttaa toimintaansa Pääkaupunkiseudulla ja jatkaa alihankintaa muilla alueilla. Palvelutason parantamiseksi alihankkijoiden toiminnoissa annettiin kehitysehdotuksia nykyisille yhteistyösuhteille.

Avainsanat:
Ulkoistaminen, logistiikka, TPL, ydinosaaminen

HELSINKI SCHOOL OF ECONOMICS
AND BUSINESS ADMINISTRATION
Department of Marketing/Logistics
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Miia Finne

ABSTRACT

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LOGISTICS OUTSOURCING: APPLICATION TO THIRD-PARTY LOGISTICS INDUSTRY

This study aims at answering the research question as to whether a firm should outsource its logistics activities or not. In order to answer this research question a theoretical framework was drawn from the literature, which addresses the crucial issue of decision-making in logistics outsourcing. The empirical part of the study concentrates on outsourcing at third-party logistics firm and presents the analysis of the pick-up and delivery processes of the case study firm, which was carried out according to the theoretical framework. Based on the analysis results managerial recommendations were given.

Logistics outsourcing is contingent on a wide range of factors and thus, it requires a thorough analysis. In order to conduct an in-depth study, a single case study approach was chosen. For the purpose of the study 14 people were interviewed. In addition, preliminary interviews were carried out in order to gain a view of the current situation. Interview data are the primary source of information for the study. Besides, customer survey results, financial records and shipment information were used.

Logistics outsourcing decision is complex and requires a precise analysis of both the qualitative and financial factors. For the decision-making it is important to define the factors, which can be used in the comparative analysis of different alternatives. For the final decision the factors can be weighted according to their importance. The case study firm uses currently both its own couriers and subcontractors to perform the delivery activities. The aim of the empirical part of the study was to define which activities were further preferable to outsource and which to keep in-house. The case study began by presenting the case study firm with its current logistics configuration and by defining the relation of delivery processes to the core competencies of the firm. The study continued with setting essential requirements for the comparative analysis.

The findings of this research suggest that the current logistics outsourcing pattern of the case firm is not quite optimal. Surprisingly it was found that from the cost perspective an outsourcing alternative is superior to the in-house alternative for all areas. Furthermore, it was found that the service level of subcontractors is often considerably lower than in-house. With regard to cost/service trade-offs it was recommended to change the outsourcing pattern in Helsinki and Espoo areas and continue with subcontracting in all other areas. In order to improve the service level of the current relationships recommendations for development were given.

Key words:
Outsourcing, logistics, third-party logistics, core competence

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1 INTRODUCTION

1.1 Background to the Study

In recent years, the outsourcing of logistics functions has been one of the leading business trends in Europe and in the US. A number of factors are behind the growth of logistics outsourcing. Among the most important is the increased competition in the global market, which has caused firm to seek means to maintain the profitability.

Among contemporary business trends today is a movement by many firms to revise their positions and focus other resources on a limited number of selected activities. This is the basis for the core competence approach, which provides some of the strongest arguments for outsourcing. Trend towards focusing on core competencies has increased the outsourcing of logistics. (Prahalad & Hamel 1990; van Damme & Ploos van Amstel 1996; Sink & Langley 1997)

The previous research on outsourcing is mostly descriptive in nature and documents the existing contract logistics and reasons for logistics outsourcing (e.g. Lieb et al. 1993; Razzacue & Sheng 1998). As Aertsen (1993) points out, the outsourcing of the physical distribution is contingent on a wide range of factors. He also claims that few attempts have been made to incorporate these factors within a theoretical framework. There is little research, which addresses the crucial issue of a decision making. This study aims at building a model for an actual decision making of an individual firm, whether it should perform a logistics activity in-house or outsource it.

Lieb and Randall (1996 cited by Andersson 1997, 12), van Damme and Ploos van Amstel (1996) have recognized that service providers when broadening their service offerings may also form alliances with other service providers i.e. outsource a part of their activities. However, previous research on logistics outsourcing concentrates often on shippers and does not include logistics service providers as acknowledged by Andersson (1997, 12). In the empirical part of this study the framework is applied to the situation of a service provider. When a logistics

service provider is outsourcing its logistics activities there is a fourth party involved in the chain as demonstrated in Figure 1-1. The fourth party is also a logistics service provider.

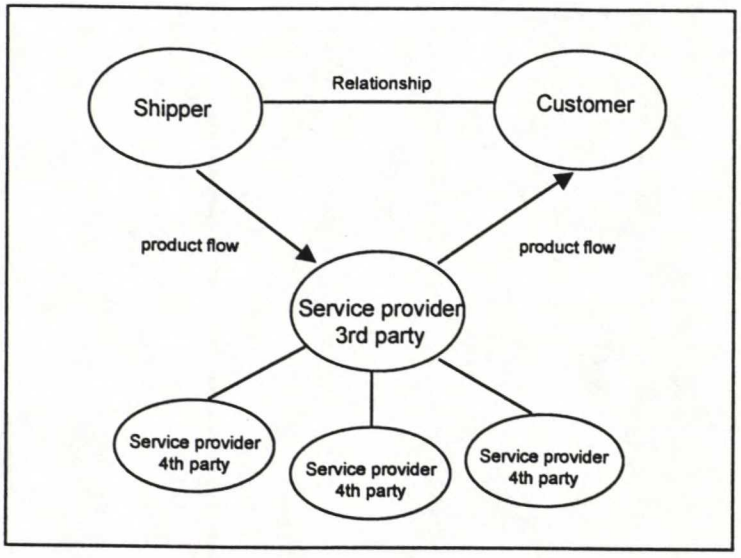

Figure 1-1 Outsourcing at Service Providers

Andersson (1997, 12) assumes that the rationale behind the relationships of two providers to be similar to those behind the alliances between shippers and service providers. In this study the same assumption is made since there is no specific research regarding the service providers' outsourcing. In the discussion part of this study this assumption is specified based on the experiences gained by using the decision making model in the service provider's situation

1.2 Research Question and Scope of Limitations

The purpose of this study is to explore the outsourcing of logistics services and to build a model for a firm's outsourcing decision. The perspective taken is managerial and from the point of view of a firm considering outsourcing. This study aims at answering the research question as to whether a firm should outsource its logistics services or not. The following questions serve as subproblems and help to determine the contents of the main objective more precisely in the theoretical part:

- What is the role of logistics in the activities of a firm? (Chapter 2)
- How can the core competencies of a firm be identified? (Chapter 3)
- What are the qualitative aspects to be analyzed in the outsourcing decision? (Chapter4.1)
- What are the financial aspects to be analyzed in the outsourcing decision? (Chapter 4.2)

The theoretical part of the study reviews the previous research and builds a framework for evaluating outsourcing decisions. In the empirical part of the study the theoretical framework is used in analyzing the case firm's situation and in giving managerial recommendations. The case firm is a logistics service provider and the empirical part of the study concentrates on the relationship between the third and fourth party in the chain (Figure 1-1).

This study focuses on the decision making regarding outsourcing. The aspects concerning the type of the relationship or provider selection are not covered in this study. This study is made from the perspective of a firm which considers whether to make logistics service in-house or to outsource. An alternative where the customer provides logistics services (Figure 1-1) is not included, since it may affect the power in the supply chain. The decision is made between in-house service and outsourcing to a service provider.

1.3 Key Concepts

We use the definition of McKinnon (1989 cited by Andersson 1995, 7-9) for **physical distribution**. Physical distribution is the process of physically transferring the goods from producer to a customer. The task is to ensure that products are available in the right place at the right time. The physical distribution system consists of five basic functions: transport, storage, breaking bulk, mixing and communication. *Transportation creates* the place utility by making products available to the customers. *Storage* creates the time utility when the products are produced in advance. When the goods arrive in large batches which have to be divided into smaller lots there is need for *bulk breaking*. *Mixing* is the consolidation of a shipment for one customer. *Communication* between producers and consumers comes from controlling the flow of goods.

In the logistics literature a number of different terms related to the outsourcing of logistics have been used (Andersson 1995, 10-12). The term **outsourcing** of logistics is used in this thesis for buying logistics service (e.g. transportation, warehousing) in any kind of relationship (Andersson 1997, 6). Some researchers define the term outsourcing as only being concerned with long-term relationships. In this study the relationship chosen is not important and thus, we accept any kind of relationship.

The term **service provider** is used in this thesis for a firm providing logistics services, i.e. as synonym for a third-party logistics firm. And in the empirical part of the study the term **subcontractor** is used for the fourth-party logistics firm.

1.4 Structure of the Study

This study is divided into theoretical and empirical parts. ***The theoretical part*** is further divided into five chapters wherein the issues that affect the decision making of outsourcing a logistics activity are discussed in detail. The second chapter outlines background of the research by assessing the importance of the logistics function in the activity of a firm. The third chapter reviews the core competence approach and provides an introduction to outsourcing. The fourth chapter presents the qualitative and financial analysis for the outsourcing decision. After presenting different approaches to logistics outsourcing decision, we propose an integrated approach to logistics outsourcing decision making in the fifth chapter.

The chapter six details the design and execution of the research study an gives outline of ***the empirical part of the study*** by presenting the case study firm with its current logistics configurations. Analysis of the case firm according to the framework is presented in the seventh chapter, which also gives managerial recommendations. The last chapter in this part discusses the results, considers the implications and limitations of the results and suggests areas for further research.

2 TRANSPORTATION AS A PART OF LOGISTICS STRATEGY

In this chapter we first define supply chain and the logistics component of a firm. We also show how to start the analysis of logistics outsourcing. A firm should have a deep understanding of its logistics requirements to be able to further analyze options for logistics. Issues that should be taken into consideration include the complexity of logistics, the supply chain structure and the strategic role of logistics in terms of its impact on customer service and competitive advantage.

2.1 Distribution Terminology

We review here central concepts regarding distribution to begin with the terms describing overall channel structures. *Marketing channels* can be viewed as sets of independent organizations involved in the process of making product or service available for use or consumption. A channel is a network that creates value for a user or consumer through the generation of form, possession, time, and place utilities. In the contrary, the term *supply chain* is used in logistics literature for a series of activities, which are concerned with planning, co-ordinating, and controlling material, parts and finished goods from suppliers to a customer. Both the material and information flows are included. Supply chain is a network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of ultimate consumers. (Stevens 1989; Stern & El-Ansary 1992, 1; Christopher 1998, 15)

A firm's links with material suppliers, carrier partners, and customers is called *supply chain integration*. According to Morash and Clinton (1997) major aspects concerning supply chain structure are operational planning, transportation information sharing, and information technology links among supply chain members. Stern and El-Ansary (1992, 154) stress the ability to reduce visible costs such as transportation, warehousing, and inventory management with an integrated logistics system. In addition to the visible costs also the hidden costs are important. These are profit opportunities lost due to a failure to ship product on time and the cost of lost sales, cancelled orders, and customer dissatisfaction associated with stockouts.

Further, *customer service* is the output from the supply system and it results form the combined effects of all functions along the supply chain. Since end users will prefer to deal with a supply chain that provides a higher level of service outputs, each activity is important. Activities in the supply chain are interdependent; if one activity fails, the chain is disrupted, creating poor performance and destabilizing the workload in other areas, thereby jeopardising the effectiveness of the supply chain. (Stevens 1989; Stern & El-Ansary 1992, 18) This view should be remembered in outsourcing, because a firm may only outsource a part of its supply chain functions. And thus, although only some functions are outsourced, they have an effect on the whole supply chain and the customer service.

Definition of Logistics

There are two concepts that relate closely to logistics. To begin with, *materials management* is the process of managing incoming material with an effective system that includes inbound transportation and inventory management (Stern & El-Ansary 1992, 149-150). *Physical distribution,* on the other hand, is applied to the outgoing product flow from the firm to customers through some defined network of transportation links and storage or distribution nodes called a distribution network. Viewed together, the materials management cycle and the physical distribution cycle form the overall logistics cycle for the firm as presented in Figure 2-1. In this study we use the term *logistics* as a generic term even though the focus is on the physical distribution function.

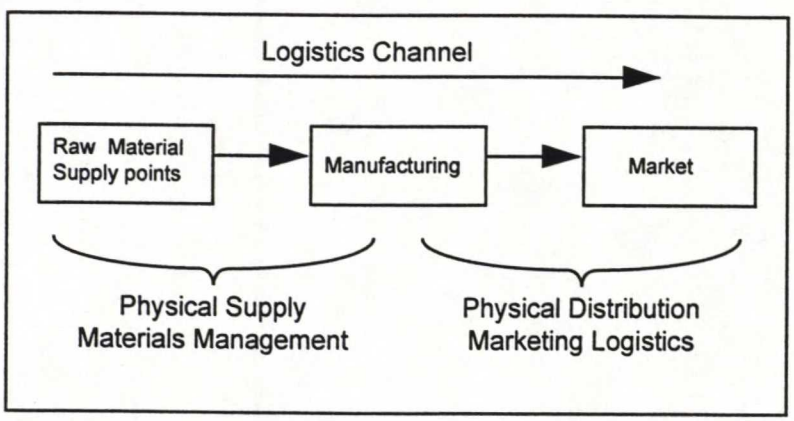

Figure 2-1: Components of Logistics Channel (Shapiro&Heskett 1985, 3)

There are several activities related to logistics function of a firm. Van Damme and Ploos van Amstel (1996) divide the logistics activities into activities concerning physical flows and activities concerning information flows presented in Table 2-1.

Table 2-1: Logistics Activities (van Damme & Ploos van Amstel 1996)

Activities Concerning Physical Flows	Activities Concerning Information Flows
– physical handling in receiving and unloading of goods and degrouping – storage control – internal transport – physical handling out including order picking, grouping and loading – reconditioning and packing including (de)palletizing, (re)packing, (re)labelling, and preparing an order for shipment – external transport both national and international – delivery – completion return shipments	– order entry – clerical handling including goods clearance, quantity check (orders, volume), and quality check – clerical handling out including check on orders and number of order lines and preparing for shipment – creditworthiness check – completion customs papers – stock control – invoicing (outgoing) – customer service (complaint resolution) – providing management information (performance indicators)

The importance of logistics lies in the process that delivers the customer service. The focus of logistics should be on the role of delivering benefits that customers desire instead on shifting a product. Logistics is increasingly concerned with managing the implementation of customized delivery strategies. Many companies concentrate on developing "logistically distinct" businesses. Moreover, the information component of logistics is growing in importance. Acceptable logistics service packages are no longer concerned only with the physical aspects of the service, but are becoming ever more concerned with the administrative, or information, aspects of managing the service. Therefore, information systems have become a key ingredient of the logistics service packages. (Christopher 1993; Fynes et al. 1995, 381; Cooper et al. 1995, 227)

2.2 Assessment of Firm's Logistics

Rao and Young (1994) find the **complexity of logistics** to be a key driver for decisions concerning logistics. The complexity of logistics operations can vary significantly among firms as a result of the products they make, the process they employ, the areas they trade, and the financial/business strategies they pursue.

Rao and Young (1994) base their analysis of the complexity of logistics on three issues. The first part is *network complexity,* which refers to both the geographic dispersion of a firm's trading partners as well as the intensiveness of transactions with selected trading partners which can give rise to volume leveraging effects. A large number of trading partners implies many more logistics transactions which must be managed. The nature of the traffic dispersion in the network is also important to note and can be explained by the number of SKU's and origin/destination pairs. Moreover, network complexity is likely to influence both the cost/service tradeoffs and need for information technology capability.

Process complexity refers to time and task compression in the supply chain. When the number of tasks, which have to be performed and co-ordinated within a short span of time, numerous cost/service tradeoffs and functional interdependency arise in operations. Key variables for measuring this driver include time sensitivity of transactions within the supply chain, manufacturing cycle times, order cycle times for customer orders. Furthermore, process complexity can influence centrality and cost/service factors. Products and materials may require special circumstances governing their transportation, storage and handling. These refer to the *product complexity*. (Rao & Young 1994)

Gopal and Cypress (1993, 21-22) introduce a list for making the analysis of the current logistics situation. They add the following components to the analysis:

- Product/material groups and volumes at each stage of the supply chain.
- Customer service levels and inventory deployment.
- Total cost by stage to address all cost elements- direct and indirect personnel, inventory carrying costs, and operational costs such as warehousing and packaging, transportation.
- Asset utilization, including in-house fleets, warehousing, field service centers, and distribution centers.
- Information systems and technology environment.

The first step in making an outsourcing decision is the assessment of the current logistics. The model of logistics complexity presented by Rao and Young is a good tool in analyzing the current situation. The list of Gopal and Cypress addresses the analysis in more detail by reviewing analyzable areas. Based on the analysis of firm's current logistics it is possible to define whether there are activities or processes, which require different solutions and thus should be analyzed separately.

2.3 Logistics Strategy

A primary reason for including logistics in the strategic planning process is to develop a logistics mission that will support overall firm goals (Fawcett & Clinton 1997). Firms seeking to gain advantage in their industries do so by differentiating themselves in some way from their competitors. When they have chosen the competitive mode, it will affect also the design of firm's logistical systems. The three commonly chosen modes of competition are new product innovation, superior customer service, and overall cost leadership. (Shapiro & Heskett 1985, 45) In defining the firm's logistical systems, it is important to review the competitive situation and to define the components by which the firm differentiates it from competitors.

As part of its strategic positioning process, a firm must choose its customer service strategy. The close relationship between logistics and customer service, and its effects on a firm's competitiveness dictate that companies handle their logistics function to achieve its full potential as a source of competitive advantage. Furthermore, the role of logistics is the development of systems and the supporting co-ordination processes to ensure that customer service goals are met. To achieve that the logistics strategies and systems should be devised in the sequence illustrated in Figure 2-2. (Fernie 1989; Razzaque & Sheng 1998; Christopher 1998, 39, 47-48)

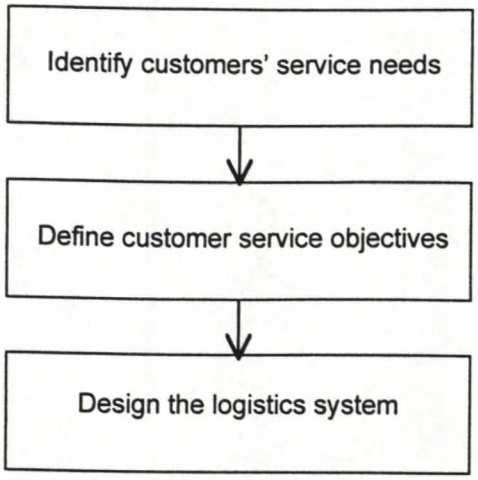

Figure 2-2 Logistics system design (Christopher 1998, 48)

Transportation

Bardi and Tracey (1991) stress the transportation aspect of logistics as the enabler for raw materials and finished goods to move through domestic and world markets. Other aspects of logistics are greatly impacted by the performance of the transportation function in a firm. They view transportation phase of logistics as an area where emphasizing value-added strategy for differentiating a firm's product or service in the marketplace enables a firm to gain competitive advantage. Morash and Clinton (1997) emphasize a supply chain view to transportation since transportation capabilities also are influenced by supply chain integration. To minimize costs and maximize customer value, transportation integration is essential within the supply chain. Moreover, the supply chain structure defines and drives the transportation capabilities of time compression, reliability, standardization, just-in-time delivery, information systems support, flexibility, and customization.

According to Morash and Clinton (1997) structural integration of the supply chain, such as operational co-ordination and information sharing, can reduce transportation time and thus total supply chain costs. Faster transit time minimizes pipeline inventory and may allow customer to lower safety stocks. If time compression results in more frequent deliveries, then cycle stocks also can be lower. Furthermore, time saved in delivery frees up time in other areas of the supply chain, which may further reduce total costs. Operational planning and re-engineering may allow for transportation and information to serve as substitutes for warehousing and inventory costs. As a result, total supply chain costs can be minimized.

2.4 Conclusion

This chapter had two objectives. First, it reviewed the terminology and defined the assessment of current logistics. Second, it addressed the strategic role of logistics for a firm. The aspects reviewed in this chapter are the basis for further considerations regarding logistics in the operations of a firm.

To review the main points, *the supply chain* is a network of organizations, which produces value in the form of products and services in the hands of ultimate consumers. Further, *logistics* is concerned with managing the product and information flows in the supply chain. Logistics has an important role in delivering customer value and thus, the customer service requirements must be considered when defining the logistics system of a firm. The desired customer service level has to be defined and logistics strategy build to fulfil the requirements. This study focuses on *transportation,* which has an important role in logistics and thus in the overall performance of logistics.

Logistics requires customized solutions because the complexity of logistics is a result of the network, processes and products the firm has. It follows that the analysis of logistics begins with reviewing the current logistics. After defining the need for logistics activities and the customer service requirements a firm basically has two alternatives. It can either do the service itself or buy it. The following chapters review important considerations a firm should make to meet the decision whether to outsource the service or not.

3 BUILDING NETWORKS AND OUTSOURCING NON-CORE ACTIVITIES

The next step after analyzing the role of logistics is reviewing activities potential for outsourcing. In the changing environment firms meet a need to build networks. This leads to concentrating on core competencies and defining the areas potential for outsourcing. This chapter is divided into three sections. The first part addresses the network approach. The second section reviews the core competence approach; how a firm can identify its core competencies, build its strategy on competencies and protect them. The last section discusses outsourcing as an alternative for serving logistics requirements.

3.1 Network Approach

In the new web-like organization, the core business, or distinctive competence, is at the center of the enterprise web. This core business is then connected to other resources outside the organization itself, representing a network of relationships. (Gupta & Zhender 1994)

A competitive advantage must not be grounded in firm's own resources, capabilities and competencies. A firm could develop a network of partners in order to gain access to external capabilities and to enrich its competence learning process. A network is a close relationship between the members. The network exists when one network member provides one function which is complementary to and synergistic with the differing contribution of other members of the network. (Humbert et al. 1997; Child & Faulkner 1998, 113)

Firms' internal structures and external boundaries may change as the environment changes. Since firms must seek to economize (or reduce cost) at all times, successful strategies for firms must be those that constantly address the issue of which type of internal or external relationships are most useful to achieve a particular purpose. Two strategic approaches, when properly combined, allow managers to leverage their companies' skills and resources well beyond levels available with other strategies: Firstly, concentrate the firm's own resources on a set of core competencies where it can achieve definable preeminence and provide unique value

for customers. Secondly, strategically outsource other activities for with the firm has neither a critical strategic need nor special capabilities. (Quinn & Hilmer 1994; Cox 1996)

3.2 Core Competence Approach

The real challenge for a firm is to consciously build dominating skills in the areas that the customer will continue to value over time. Problems may occur when managers choose to concentrate too narrowly on products or services or too inflexibly on formats and skills that no longer match customer needs. The core competencies are firm's activities that really do create unique value and which the firm could not more effectively buy externally. Competencies tend to be sets of skills that cut across traditional functions. This interaction allows the organization to consistently perform an activity better than functional competitors and to continually improve on the activity as markets, technology, and competition evolve. (Quinn & Hilmer 1994)

Resources are inputs into the production process. Productive activity requires the co-operation and coordination of teams of resources. A capability is the capacity for a team of resources to perform some task or activity. The competitiveness of a firm derives in the short run from price/performance attributes of current products/services. To also be competitive in the long run the firm must be able to consolidate its skills into competencies. With competencies the firm is able to adapt to changing opportunities. (Prahalad & Hamel 1990; Grant 1991)

Firm capabilities are those things that a firm does especially well and that allow it to compete successfully and prosper in the marketplace. Capabilities are the sources of a firm's competitive advantage. Examples of logistics capabilities are customer service, product availability, time advantages, and low cost distribution and delivery reliability. (Grant 1991; Morash et al. 1996).

Identifying Core Competencies

Prahalad and Hamel (1990) introduce three tests to identify core competencies. First, a core competence should provide potential access to a wide variety of markets. In addition, it should make a significant contribution to the perceived customer benefits of the end product or service. And a core competence should be difficult for competitors to imitate.

When defining core competencies managers need to carefully consider the activities that really create unique value. Quinn and Hilmer (1994) suggest a list of special characters for core competencies. Effective core competencies are: 1) skills or knowledge sets, not products or functions, 2) flexible, long-term platform -capable of adoption or evolution, 3) limited in number, 4) unique sources of leverage in the value chain, 5) areas where the firm can dominate, 6) elements important to customers in the long run, 7) embedded in the organization's systems.

Although most examples are from manufacturing industry, Prahalad and Hamel (1990) recognize the importance of core competence approach also in the service industry. They use superior customer service, which provides the means to differentiate it from other providers, as an example for a core competence in the service sector.

Sink and Langley (1997) emphasize that a core competence does not preclude the involvement of an external supplier, as long as the activity or process continues to create value that is unique and competitively advantageous. For example, a firm that outsources its transportation and warehousing activity may not have core competence in that area but in its ability to manage the relationships with firms who do excel in that activity.

By using transaction cost analysis, Reve (1990, 140) suggests that the core competencies of a firm are normally of four types: Site Specificity (Resource Immobility), Physical Asset Specificity (Technological Advantages), Human Asset Specificity (Know How Advantages), and Dedicated Assets (Specialized Investments). It is these skills that a firm must defend internally at all costs if it is to sustain a position on a value and supply chain.

Logistical core competencies may exist in one part of the supply chain and thus in one logistics activity, in one subprocess or they may be in several parts. Thus, the core competence analysis in logistics should include each activity or subprocess.

Building Strategy on Competence

The traditional way in evaluating the performance of a firm emphasized the outside-in view where the firm's success was based on the adaptation of its resources in order to obtain a fit with the environment. In the new resource-based view the resources, capabilities, and competencies of the firm are the sources of a potential competitive advantage. The environment and the product activities reach less attention. Since the competition in many markets is increasing, the companies are more dependent on the success of new business efforts. In building these efforts the core competence concept is essential. (Bakker et al. 1994; Humbert et al. 1997)

Grant (1991) defines that the differentiation advantage of a firm stems from brands, product technology, marketing, distribution and service capabilities. Competitive advantage involves both differentiation and cost advantages. According to Quinn and Hilmer (1994) true focus on strategy means the capacity to bring more power to bear on a selected sector than any competitor can. By specializing in the specific skills and technologies underlying a single element in the value chain, some outside supplier can become more proficient at that activity than virtually any firm spreading its efforts over the whole value chain. Morover, at least one of the firm's core competencies should normally relate directly to understanding and serving its customers.

Protecting and Defending Core Competencies

The core competencies are built on intangible assets which cannot be easily imitated. However, they would also be difficult to replace, if a firm found them destroyed or damaged. When a firm's pre-eminence in selected fields grows, its knowledge-based core competencies become more and more difficult to overtake. Knowledge bases tend to grow exponentially in value with investment and experience. Core competencies are the activities that offer long-term competitive advantage and thus must be digidly controlled and protected. (Quinn & Hilmer 1994; Harvey & Lusch 1997)

There is a risk of losing core competence, if the organization is divided into a multiplicity of SBU's (strategic business units) and no single business may feel responsible for maintaining a viable position in core products. For the selected core competencies, the firm must ensure that it maintains absolute pre-eminence. It may also need to surround these core competencies with defensive positions. The firm should develop the core competencies to strategically block competitors. In addition, it should avoid outsourcing activities or giving suppliers access to the knowledge bases or skills critical to their core competencies. (Prahalad & Hamel 1990; Quinn & Hilmer 1994)

According to Prahalad and Hamel (1990) there should be a corporatewide strategic architecture that establishes objectives for competence building. For this reason, a firm must answer some fundamental questions: How long could we preserve our competitiveness in this business if we did not control this particular competence? How central is this core competence to perceived customer benefits? What future opportunities would be foreclosed if we were to lose this particular competence? The strategic architecture is the base for resource allocation and it should make the priorities transparent.

Prahalad and Hamel (1990) stress that the loss of core competencies can be only partly calculated in advance. Core competencies are build through a process of continuous improvement that may last a decade or longer. A firm that has failed to invest in building a core competence will find it very difficult to enter an emerging market. A firm must choose where it will build competence leadership. After that the firm is able to build a sourcing strategy and protect its core competencies.

Use of an external supplier may be justified because the activite or process simply does not meet any of the three tests of core competence. In that case, outsourcing is a viable business strategy because turning non-core functions over to external suppliers enables management to leverage it resources, spread its risk, and concentrate on issues critical to survival and future growth. (Sink & Langley 1997) In the following the outsourcing of logistics activities is discussed in more detail.

3.3 Outsourcing: Definition and Background

In order to handle its logistics activities effectively and efficiently, a firm may consider the following options. (Razzacue & Sheng 1998)

1) It can provide the functions in-house by making the service.
2) It can own logistics subsidiaries through setting up or buying a logistics firm.
3) It can outsource the function and buy the service.

Outsourcing is the practice of one firm providing a service or product for another; and in this process, organizations become interconnected in a network. The objective of outsourcing is to enhance the firm's performance. The whole idea of outsourcing is founded on the fact that the service providers have several clients, which among other things can result in economies of scale. The benefits from buying services from specialist suppliers have been recognized for many years. The first outsourced services have been cleaning and catering, during 1980's also distribution reached much attention as a potential activity for outsourcing. (Gupta & Zhender 1994; Baily et al. 1994, 191-192; Andersson 1997, 12; Kee 1998)

Outsourcing involves focusing the firm's capital and human resources on activities that enhance the firm's competitive advantage and leaving its remaining activities to more cost-efficient suppliers. The objective of outsourcing is to enhance the firm's competitive advantage and, thereby, improve its financial performance. However, firms that have outsourced their activities have frequently experienced increased rather than decreased cost. This often results from using inaccurate estimates of the actual costs. Inaccurate estimates of cost can lead to outsourcing activities that would be more economical to perform in-house and carrying out activities that would be more cost efficient to purchase. The problem of cost estimating is addressed in the fourth chapter. (Kee 1998)

The term outsourcing can cover many areas, of which the most common has traditionally been the outsourcing of manufacturing, e.g. subassemblies in automotive industry. However, outsourcing of services has become more common, and recently outsourcing of information technology has reached much attention. As Aertsen (1993) points out, the outsourcing of the physical distribution is contingent on a wide range of factors. The following two chapters

addresses factors to be analyzed in the outsourcing decision. In this chapter we discuss outsourcing as an alternative in logistics, how third party services and suppliers can be categorized and how the procurement of logistics services differs from the procurement of components.

Building core competencies is more ambitious and different than integrating vertically. A firm deciding whether to make or buy will start with end products and look upstream to the efficiencies of the supply chain and downstream toward distribution and customers. Of course, decisions regarding competencies do provide logic for vertical integration. Furthermore, a firm outsourcing its transportation activity may not have core competence in that area but in its ability to manage the relationships with firms who do excel in that activity. (Prahalad & Hamel 1990; Sink & Langley 1997)

Outsourcing Decision

Van Damme and Ploos van Amstel (1996) highlight the importance of the logistics outsourcing decision because of its strategic importance to the firm, as was presented in the second chapter. Thus, the decision has an effect on the whole organization for a longer period of time and if the decision to outsource is made, it is difficult to reverse. Langley and Holcomb (1992) claim that a well-managed logistics operation can create value for a customer regardless of whether logistics is performed internally or externally of the firm. This is one of the most important evaluations in an outsourcing decision.

Proper analysis of the outsourcing decision requires that an organization considers the strategic elements of outsourcing as well as undertakes a thorough analysis of the true internal and external cost implications as proposed by Ellram and Maltz (1995). In principle, the issue of whether to outsource a logistics function is a variation of the traditional make-or-buy decision. Make-or-buy is a term for the crucial decision of how a firm obtains goods and services. (Maltz & Ellram 1997) The same view to the decision is adopted in this study and the last part of analysis is build as a make-or-buy decision. In the following chapter we define the components for the analysis.

The outsourcing decision should be considered either for each separate logistics activity or for a combination of activities. Furthermore, the entire goods flow should be taken into consideration. A firm investigating an outsourcing alternative should begin by constructing process flow diagrams for both current system and the prospective alternative. (Ellram & Maltz 1995; van Damme & Ploos van Amstel 1996)

Quinn and Hilmer (1994) suggest that managers must answer three key questions regarding any activity considered for outsourcing. First, what is the potential for obtaining competitive advantage in this activity, taken into account the transaction costs? Second, what is the potential vulnerability that could arise from market failure if the activity is outsourced? Third, what can we do to alleviate our vulnerability by structuring arrangements with suppliers to provide appropriate controls yet for necessary flexibilities in demand?

Key Concepts in Outsourcing

Several terms are used to describe outsourcing of logistics services or logistics alliances. An often-used term is Third Party Logistics (TPL); others are Contract Logistics, Logistics Outsourcing and Contract Distribution. The number of services that are being outsourced varies and so does the depth of the relationship between the user and the provider of services. (Bagchi & Virum 1996) Lieb et al. (1993) uses the term third-party logistics services as a synonym for outsourcing and contract logistics. According to them the outsourcing arrangement may regard only one service or be broad encompassing the entire supply chain. Some researches make a difference between the terms regarding the depth of the relationship and the number of services that are being outsourced (e.g. Andersson 1997, 6-7) and use the term third-party logistics only for long term relationships and several services. In this study logistics outsourcing is defined to be buying logistics services in any kind of relationship and third-party logistics is used as a synonym for it.

3.3.1 Third-party Logistics Services

This part of the chapter introduces different forms of outsourcing relationships, TPL services and providers. Here only one way to categorize these is presented; there may be other ways to categorize as well. The focus of this study is not in the transportation mode or carrier selection.

These topics are already extensively studied in the logistics literature and thus not reviewed here.

Outsourcing Relationships

If a firm reached the decision that some logistics operations should be outsourced or if a number of services already were outsourced, the question would be in which kind of relationship the services should be bought. The decision regarding the type of relationship, the type of provider and the specific provider chosen will influence each other. The type of relationship considered could influence the outsourcing decision and thereby several relationship options should be considered before the outsourcing decision is made. (Andersson 1997, 14)

There are various stages in relationships which may apply to outsourcing of logistics services. *Adversarial leverage* is the most commonly understood form of external contractual relationship. This form of relationship is always arms' length. The prime contractor is always in the position of being able to choose alternative sources of supply because there are multiple sources of supply. *Preferred suppliers* are judged to be the best to provide complementary services. *Single sourcing* refers to single sourced and negotiated external contracts. *Network sourcing* is the idea that it is possible to create a virtual firm at all levels of the supply chain by engineering multiple-tiered partnership relationships at each stage, but without moving to vertical integration. *Strategic supplier alliances* are negotiated, single sourced relationships with a supplier of a complementary service. (Cox 1996)

Services

Figure 3-1 introduces different forms of TPL services. The different forms of services are divided according to management and capacity dimensions. The management dimension addresses the issue of responsibility in organizing the work (client or provider). The capacity dimension addresses the issue of the number of clients served with the same capacity.

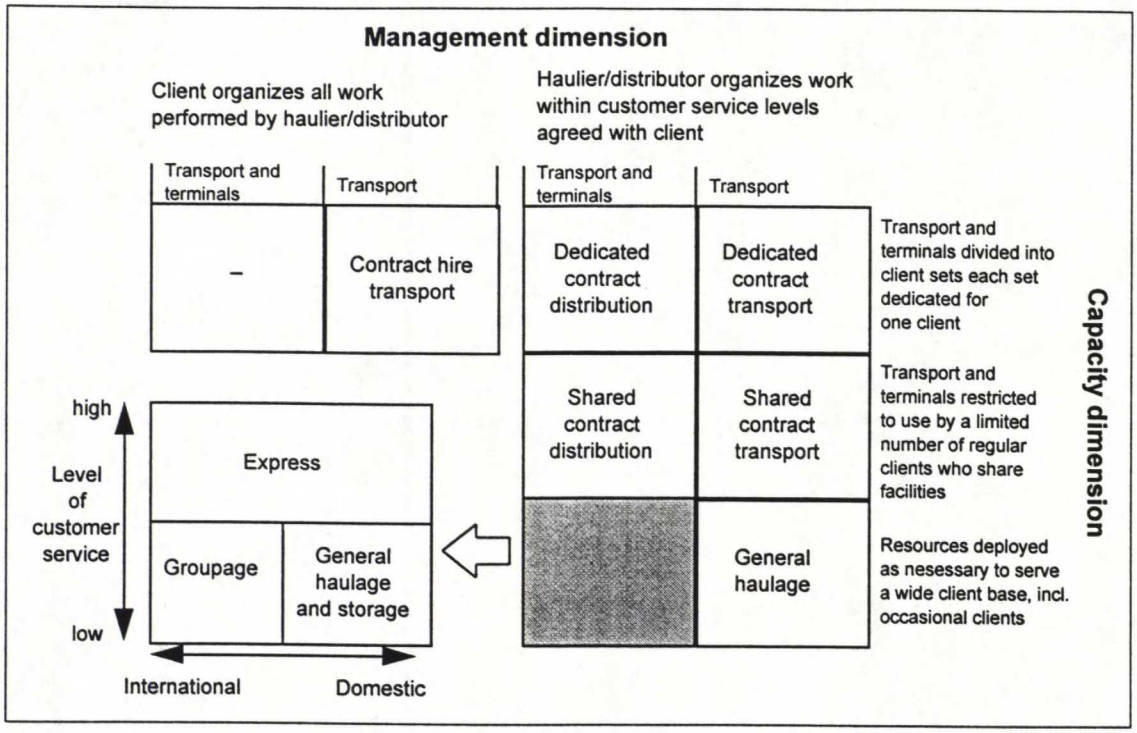

Figure 3-1: Third party haulage and distribution services (Cooper et al. 1995, 166)

Contract Hire Transport is a more stable, long-term relationship where the distributor provides vehicles and drivers and the client organizes the work. *Dedicated Contract Distribution* is exclusive, total distribution service. This is a "tailor made" service for clients. This type of service is currently in demand in multiple retailing, especially in the food sector. *Shared Contract Distribution* arises when several clients of a distributor have specialized needs in common e.g. a product group or a market sector. The distributor is able to consolidate consignments which benefits the clients. This service is more common with manufacturers who supply retailers. (Cooper 1995, 167; Fernie 1989)

Most *express* services are sophisticated versions of a common user service where loads are consolidated to benefit from scale economies. The consignment sizes are often smaller than in other services. They offer a high-level of customer service. *Groupage* is similar to express service. They accept larger consignment sizes, but the delivery will invariably be slower. *General Haulage and Storage* is a common user service where the haulier provides also a variety of storage facilities. *General Haulage* is common user service where the haulier performs only a transport operation. (Cooper 1995, 167; Fernie 1989)

Service Providers

There are different types of TPL service providers. We present the categorization of Muller (1993).

1) *Asset-based vendors.* Companies which offer dedicated physical logistics services primarily through the use of their own assets, typically a truck fleet or group of warehouses.

2) *Management-based vendors*. Involves in offering logistics management services through systems databases and consulting services, often acting as a subcontracted traffic department, either for part, or all, of a client's business segments. These firms do not own transportation or warehouse assets.

3) *Integrated vendors.* These companies own assets, typically trucks, warehouses or a combination of both. They are not, however, limited to using those assets, and will contract with other vendors on an as-needed basis.

4) *Administration-based vendors.* Firms, which mainly provide administrative management services such as, freight payment.

There are any disadvantages of choosing asset-based service providers (Africk and Calkins 1994, cited by Razzaque & Sheng 1998). First they have the knowledge and experience in handling and maintaining equipment, facilities, and physical operations. Second, they can pass on savings to users and last part is that they help to reconfigure operations to improve efficiency reduce costs and/or improve service

3.3.2 Procurement of Logistics Services

Bradley (1994a cited by Razzacue & Sheng 1998) claims that there is no difference between outsourcing logistical functions and any other procurement process. We want to highlight the differences between buying services and products and show that the differences make the buying of services more complex. The differences also have an effect on the sourcing decision. First, the common view to procurement of services is addressed and then the procurement of logistics services is discussed in more detail.

Procurement of services is more complex and uncertain than the acquisition of products. Much of the difficulty is attributable to the differences between products and services. A primary distinction is the inability to store services. This leads to quality assurance difficulties, since it is often not possible to measure the delivery of a service until it is actually provided. Furthermore, by the time the service is delivered, it may be too late to do anything about the results. Other differences between products and services relate to tangibility and the nature of delivery. Logistics outsourcing involves acquiring a process rather than a discrete quantity of part. In distribution, for instance, the third-party does not supply an individual part or component, but rather a series of transactions that, in routine order situation, begins with the receipt of customer order and ends with delivery. (Sink & Langley 1997; Maltz & Ellram 1997)

A logistics manager must also monitor service over time. Here information systems which track the process can help. The time between the order and the final delivery can range from hours to weeks. In component outsourcing the buyer only needs to know that the order has been placed and that the quality of the products received is adequate. Based on these differences Maltz and Ellram (1997) suggest that the usual make/buy decision is different for logistics. Their conclusion regarding the differences is presented in the Table 3-1.

Table 3-1: Difference between component make/buy and logistics services perform/purchase (Maltz & Ellram 1997)

	Make-or-Buy (Components)	**Perform-or-Purchase (Logistics Services)**	**Implications for Total Cost of Relationship**
Type of Purchase	Product/Commodity	Process/Series of Transactions	Multiple external interfaces Increased monitoring costs
Customer	Internal	External	Customer needs drive activities, monitoring, and reporting
Interfaces	Supplier/buyer	1) Logistics buyer/ logistics supplier 2) Logistics supplier/ final customer	Modify Total Cost of Ownership for process nature of logistics services Include customer service and satisfaction measurement costs
Quality Measures	1. Conformance to objective specifications 2. Delivery reliability	1. Reliability 2. Flexibility/ responsiveness 3. Customer satisfaction	Need to develop measures and evaluate "soft" aspects of service quality Less well-defined objective standards
Method of Insuring Quality	Statistical Process Control Supplier Certification	Customer Feedback Comprehensive transaction measurement	Multiple transactions imply multiple points of measurement Limited applicability of statistical techniques
Decision	Purchasing/Manufacturing	Distribution / Logistics	Marketing vs. Operations outlook

Quality of Service

Due to characteristics of services, precise specifications for uniform quality rarely can be established. In most services, quality occurs during service delivery, usually in an interaction between the customer and contact personnel of the service firm. For this reason, service quality is highly dependent on the performance of employees. (Zeithaml et al. 1988)

Service quality has multiple facets ranging from hard measures such as on-time delivery and order fill rates to softer constructs like customer satisfaction and personnel responsiveness. These soft aspects are important to the make-or-buy decision of services. The challenge is to somehow combine the hard and soft measures which are associated with logistics services. (Maltz & Ellram 1997)

Zeithaml et al. (1988) suggests the consumers' quality perceptions be influenced by a series of five distinct gaps occurring in organizations. Hopkins et al. (1993) have studied the service quality in the transportation industry by using the gap model from Zeithaml et al. (1988). Their modification of the model for transportation services is presented in the Figure 3-2.

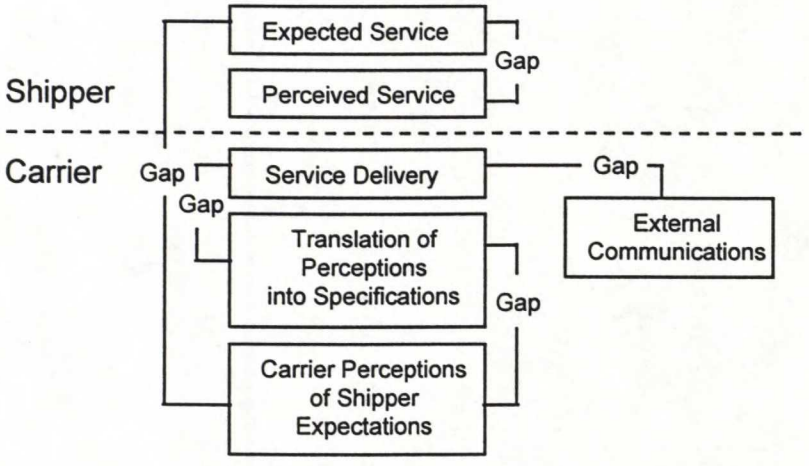

Figure 3-2: Service Quality Model for Transportation Services (Hopkins et al. 1993)

Because of the complex nature of the quality of services, the issue regarding measuring and assuring the service quality becomes even more important. In an outsourcing situation a shipper buys the service from carrier, but does not see the service since the delivery is directly to the customer. The interfaces are logistics buyer/logistics supplier and logistics supplier/final customer. The shipper gets the information regarding the service from the customer (customer feedback). The expectations from customer may also differ from those of shipper which may widen the gab between expected and perceived service and thus the level of quality.

The service may be essential to the relationship between shipper and customer and any failure in service may cause serious consequences. In this situation and other situations as well, the shipper need to have a way to prove the quality of the service. Since an important part of the quality derives from the performance of employees, it is a part of the consideration in the outsourcing decision.

3.4 Conclusion

After defining the role of logistics in the firm, the existing core competencies of the firm should defined. When analyzing the logistics activities, the firm should first find core competencies that should be performed in-house. In the analysis the three tests introduced by Prahalad and Hamel (1990), could be used. Firstly, a core competence should provide potential access to a wide variety of markets. Secondly, it should make a significant contribution to the perceived customer benefits of the end product or service. Thirdly, a core competence should be difficult for competitor to imitate.

The identification of core competencies is followed by a consideration of outsourcing the non-core activities. The outsourcing decision can be seen as the decision as to what extent the firm should vertically integrate its logistics activities. Furthermore, the issue whether to outsource a logistics function is a variation of the traditional make-or-buy decisions. In the following chapters the components for the decision are defined.

The outsourcing decision should be considered either for each separate logistics activity or for a combination of activities. The entire goods flow should be taken into account. A firm investigating the outsourcing alternative should begin by constructing process flow diagrams for both current system and the prospective alternative. (Ellram & Maltz 1995; van Damme & Ploos van Amstel 1996)

A firm may consider different relationships for outsourcing as well as different providers. The relationships are studied in more detail in the following chapters. The most important difference between outsourcing of logistics and outsourcing of product manufacturing is that logistics outsourcing involves acquiring a process rather than a discrete quantity of part. Also the inability to store services and the intangibility of services make the decision more complex. Due to the characteristics of services it is a difficult task to define service quality. If a firm outsourced its logistics services, it should consider how to assure the quality of the service.

4 ANALYZING LOGISTICS SERVICES OUTSOURCING

Identification of core competencies is not the only criterion for the outsourcing decision. Thus, in this chapter other critical issues regarding decision-making are addressed. The purpose of this chapter is to define the critical factors for the outsourcing decision that are influenced by the nature of a firm and its operations. Also relationship and demand uncertainty is reviewed. We aim at building a decision-making model and thus we discuss how these factors should be considered in making the outsourcing decision. Because of the complex nature of the decision, there are several aspects to be included. This chapter focuses on general criteria. Obviously, there are criteria that need to be specified for each firm. This chapter consists of two sections. The first section addresses qualitative factors and the second section financial factors.

4.1 Qualitative Analysis

Logistics outsourcing analysis should include qualitative factors (Maltz & Ellram 1997). The qualitative factors may be difficult to evaluate, but they are important for gaining a realistic estimate of alternatives for the actual decision. The first section studies logistics in the customer interface. The second section defines the need for control and its effect on the decision. Finally the sources of uncertainty and how they affect the outsourcing decision are reviewed.

4.1.1 Customer Service Requirements

Logistics plays a critical role in delivering customer service as reviewed in the second chapter. In this part of the chapter it is defined how outsourcing may affect the contact with customers and how it should be considered in the outsourcing decision. It is worth of defining the differences that may occur and define how the activities are managed in each alternative.

After defining the importance of logistics and setting requirements for customer service, the firm needs to weigh the various components of customer service. In the end, the alternatives can be analyzed. Sink and Langley (1997) stress that requirements in service evaluation should mirror the customer service policy established by the purchaser for its customers. Further,

assessment methods used must include both qualitative and quantitative tools. They stress the importance of weighting the value of service-enhancing elements.

The actual service level must be evaluated. Van Damme and Ploos van Amstel (1996) suggest that a service provider can utilize capacity better and invest in specific know-how, as logistics management is its core activity. They also suggest that the service provider can improve the quality and flexibility of service and hence improve customer service. Also Fernie (1989) claims that contractors can provide better customer service levels than own-account operations. According to him this is attributed to shippers putting pressure on the contractor to perform better or to lose the contract renewal. Own-account operations may not have to operate under such a pressure.

Bowersox et al. (1986, 27-28) measure logistics performance with respect to availability, capability, and quality. *Availability* concerns the system's capacity to consistently satisfy material or product requirements. As such, availability deals with inventory level. *Capability* refers to the elapsed time from receipt of an order to inventory delivery. Performance capability relates how well the overall logistical task is completed with the respect to damage, correct line items, and resolution of unexpected problems. *Quality* relates to the maintenance of low error rates. Furthermore, Morash and Clinton (1997) define transportation *reliability* as reduced variability of shipment time. Another dimension is the absence of shipment loss and damage. Unreliable service that delivers partially filled orders and/or damaged articles can significantly increase supply chain costs. Lack of transportation flexibility can raise inventory carrying costs, ordering costs, lost sales, and production costs.

Logistics in the distribution side involves direct connection to customers. Monitoring and control of customer contact, whether made by third-parties or firm personnel, is clearly a high priority for any firm. It is important to gather information regarding customer perceptions of service quality as was addressed in the third chapter. The total cost of third-party logistics should include expences for monitoring and recording supplier service to the final customer. Customer feedback mechanisms must be established, if the firm's own employees no longer have direct customer contact. Visibility of the whole customer service process has to be costed

out, assuming that the information will have to be gathered from third parties and customers themselves. (Maltz & Ellram 1997)

Van Damme and Ploos van Amstel (1996) point out that outsourcing will bring about less frequent and less direct customer contact, which means the customer's feedback reaches the firm less rapidly. As a result, the firm will react less quickly to changing customers' desires. Many companies want to keep logistics management in-house in order to maintain direct customer contact. The firm holds specific know-how regarding its product and can respond to changing customer desires in flexible manner, whereas a service provider, for reasons of efficiency, wishes to minimize deviations from schedules. It is plain that flexibility can be at expense of efficiency. However, a service provider is more capable of complying with specific customer requirements because of its expertise in a certain type of service.

Fernie (1989) raises the issue about the importance of the corporate image presented by the drivers and warehousemen. However, the importance is not easy to weigh but it should be considered in the decision. Bradley (1994) claim that a contract logistics firm with national and regional expertise can even provide a customer a local image even though the firm may have no local presence in assets and logistics employees.

The elements of customer service and customer relationship are various. As presented in the second chapter, the customer service element is of high importance and thus, the aspects regarding customer service belong to the main issues in decision-making.

4.1.2 Control Requirements

The need for control may regard the supply chain or a specific activity. Under certain circumstances, a firm may need to control the supply chain to ensure market access. Control over a specific activity regards the capacity and price of the activity. A firm is able to get more control through vertical integration. In this section first the driving forces to the need of control are defined and then the specific activities are addressed that may need control. Also the advantages and disadvantages of vertical integration are reviewed and how outsourcing affects control in the supply chain.

Vertical control can be obtained either through ownership or corporate agreements. Only for activities of high asset specificity ownership is necessary. When asset specificity is at a medium level, external contracts can secure the necessary amount of vertical control. (Reve 1990, 146-148)

Quinn et al. (1990) propose that a firm needs to focus on two set of activities: those where it can create unique value (i.e. core competencies) and those it must control to maintain its supremacy in the critical elements of its value chain. Such elements may also be logistics functions and the control is gained through vertical integration. Furthermore, Anderson and Weitz (1986) propose that firms integrate vertically to gain greater control over their economic environment. They may use forward integration to ensure market access through limited distribution channels. Vertical integration can reduce both risk and cost when channel members or suppliers can become powerful.

If a firm keeps logistics activities in-house it bears responsibility for personnel matters, equipment, price and capacity. The shipper needs to pay attention to recruitment, selection and training of necessary personnel, purchase and maintenance of necessary equipment, transport licenses, regulations governing driving hours and other legal provisions. The responsibility for these activities can be regarded as a disadvantage. However, the control on these is an advantage. (Cooper et al. 1995, 202; van Damme & Ploos van Amstel 1996)

Bagchi and Virum (1996) stress that logistics control and the strategic aspect of logistics are always in-firm management functions. Very often, a firm will also choose to keep most or all-administrative activities in-house. Careful and accurate planning of the integration between the outsourced services and the in-firm processes is essential for a successful outsourcing.

Vertical integration improves channel performance by providing better control over channel activities. But there is also a motive for vertical integration when economies of scale can be achieved. Also the possibility of specialization through logistics is an important motive for vertical integration. By controlling the distribution channel, a firm creates a strategic advantage, which may enable the firm to differentiate its offerings. (Anderson & Weitz 1986; Williamson 1985, 60 (cited by Maltz 1994)

Maltz (1994) suggests that high value items should be exposed to serious risks of loss and damage during the logistics process. Thus, companies producing and distributing such products will seek the maximum control of the process to minimize the chances of losses. Furhermore, if third party use is associated with loss of control, as suggested by Fernie (1989), the physical distribution of those products will be kept in-house.

Van Damme and Ploos van Amstel (1996) conclude that if a firm carries out logistics activities in-house, it can take action very rapidly in cases of wrong deliveries and damage. If logistics has been contracted out, rapid reactions could be obstructed by the necessary consultations with the service provider by any agreements made. Thus, the relief induced by outsourcing is also paid for by greater dependence. Based on this view the responsiveness to changes should be included in the analysis.

4.1.3 Level of Uncertainty

Need for control may be linked with the level of uncertainty a firm meets. The level of uncertainty stems from uncertainty in demand and relationship and from the fear of losing expertise in logistics. These aspects should be considered in the outsourcing decision since the uncertainty may have a great effect on the decision.

Demand uncertainty

The need for logistics services may change over time due to different reasons. Fernie (1989) notes that changes in demand result not only from seasonal peaks like Christmas. While there are seasonal variations in volume levels, there are also spatial variations in volumes distributed. In specific geographical areas the volumes may be low. In this section, first a look at the possible reasons for the need for flexibility is taken. Next, its impact on the outsourcing decision is discussed.

Every firm is confronted with a changing demand for its products. Often a decreasing demand cannot be compensated by a rising demand for another product, thus causing instabilities in capacity utilization. Van Damme and Ploos van Amstel (1996) claim that a service provider does not meet the same challenge because they serve several clients enabling the counterbalance. The use of contractor in order to gain flexibility in responses to changes in the

marketplace is acknowledged also by Fernie (1989). By using third-party services some firms have become flexible in deliveries, while other have taken advantage of the longer hours over which third-party firms operate (Lieb et al. 1993). However, a service firm may also have similar fluctuations in demand as a manufacturing firm. This is because the fluctuations of its several clients are similar.

With a high need for flexibility due to e.g. changing demand or geographic differences, it is preferable to outsource the activity. A service provider may be able to counterbalance the differences between the shippers and get economies of scale by consolidating the shipments from several shippers, which results in a cost advantage. If need for flexibility is low, and demand is stable, there are no barriers to perform the activity in house. Many firms have characteristics of both and therefore, they may choose a hybrid solution where a part of the activities is performed in house and a part is outsourced. Alternatively, they can outsource only peak demands which can be calculated in advance. In addition, flexibility is also one requirement to be set for logistics activity. In the Figure 4-1 the level of flexibility and control need is translated into the contract relationships. Full ownership is an alternative of vertical integration.

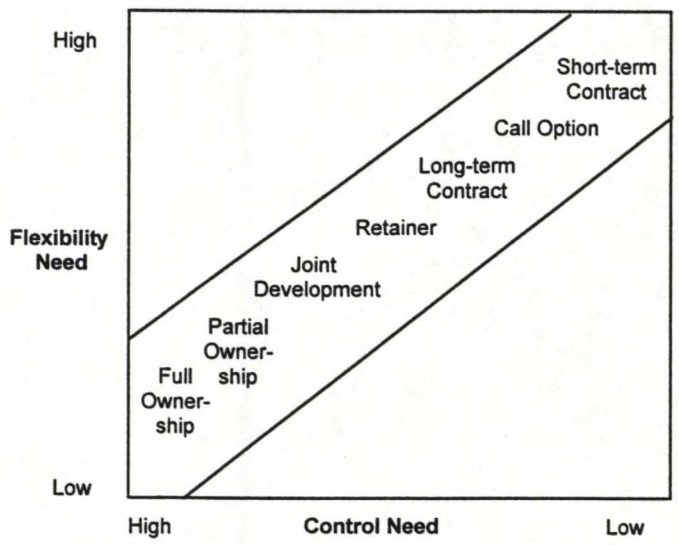

Figure 4-1: Potential Contract Relationships (Quinn and Hilmer 1994)

Relationship uncertainty

Uncertainty that derives from buyer/seller relationship, coupled with heavy investments in a relationship, will push the user of the service toward vertical integration. Uncertainty exists when the buyer cannot judge if the third-party is charging premiums. To eliminate the premium the firm operates the logistics function itself. Another way to decrease the level of uncertainty is to draw up a system of logistical performance indicators, allowing the shipper to continuously evaluate the service provider's activities. The decrease in control, caused by increasing amount of segments in the chain, can be compensated by agreements fixed by contract. A service provider should have a cost control system with a clearly and logically composed tariff structure. (Williamson cited by Maltz 1994; Van Damme & Ploos van Amstel 1996)

Bowerman (1997) raises the issue regarding *cultural fit* between service provider and shipper. He admits that it is not exactly a measurable criterion but it is important as an indicator of the future success of the relationship. A firm considering outsourcing has to define if the cultural fit can be measured. One such area may be personnel. The importance of personnel in the delivery service quality was highlighted in the third chapter. Therefore, when evaluating a service provider's output the service provider's personnel management is an important element of quality. How does the service provider feel about personnel motivation, education and development? The service provider has to realize that its staff is in contact with the shipper's customers and thus represent the shipper to customers. (van Damme & Ploos van Amstel 1996)

Shippers contracting out activities are often worried about the *security of firm information*, as they have to share confidential data. Especially a service provider who is also working for shipper's competitors can do damage to shipper. Also, the *financial strength* of a service provider has also to be evaluated. If a logistics function is contracted out, it is not for a short period of time; the fact is that the reverse process from buy to do is much more difficult. The service provider should not be dependent on one or two shippers as that could be at the expence of continuity. (van Damme & Ploos van Amstel 1996)

Trust and Relationship Commitment in Logistics Alliances: A Buyer Perspective

The existence of trust in a relationship reduces the perception of risk (uncertainty) associated with opportunistic behaviour and allows each party to believe that its needs will be fulfilled in the future by actions taken by the other party. A long-term perspective, a lack of a distinct endpoint, and a focus on future actions rather than currents transactions, characterizes commitment in logistics relationship. (Moore 1998) Next we discuss the complexity of logistics alliances by using the model developed by Moore. The model is made for existing relationships, but it does show the important areas for future relationships as well.

In the model of logistics alliances Moore (1998) has four exonous variables (third party's equity, information exchange, relationship commitment, and buyer's relationship benefits) influence two major mediating variables (buyer's trust in third party and relationship conflict) and three outcome variables (buyer's risk of third party opportunism, relationship effectiveness, and relationship commitment). Next each variable is discussed in more detail.

Ring and Ven de Ven (in Moore 1998) define *equity* as fair dealing, they also believe, that parties in co-operative relationships are motivated to seek equity outcomes. Although there are significant risks in a logistics alliance, the knowledge that both parties are willing to share benefits and burdens should mitigate the risk. Long-term expectations of equity in a relationship make short-term inequities less important.

Firms establish relationships to gain benefits. *Organization's commitment* to an exchange relationship can be hindered if the organization perceives it is not receiving its excepted benefits. Relationships for which expected returns and costs are well defined are expected to be more effective, and higher payoffs are related to greater effectiveness in a relationship. Achieving these expected benefits should increase a buyer's commitment in a logistics relationship. (Moore 1998)

Conflict is the overall disagreement in a relationship that can be characterized by mutual interference or blocking behaviour. It has been suggested that conflict is an important and inevitable element of interorganizational exchange relationships. *Trust* is having confidence in or relying on another party to fulfill its future obligations. A buyer who trusts a third-party will

likely view the risk of third party opportunism as minimal. *Relationship effectiveness* is a qualitative measure of the overall success of an exchange relationship. Relationship effectiveness is the degree to which a party in a relationship views the relationship as being worthwhile, productive, and satisfying. The model from Moore (1998) is presented in the Figure 4-2.

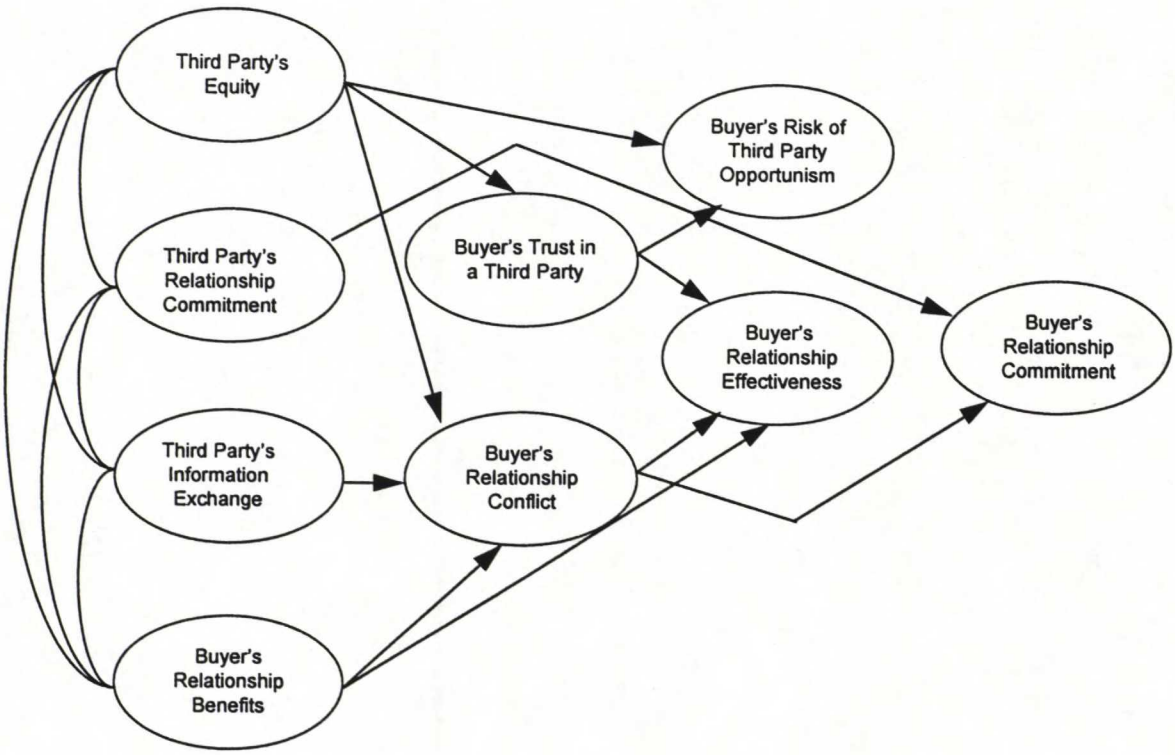

Figure 4-2: Model of Logistics Alliances (Moore 1998)

According to Moore (1998) *buyer's commitment* to a logistics alliance is significantly influenced by negative outcomes associated with conflict. The only construct having a direct positive influence on a buyer's commitment is third-party commitment. Buyers are committed to maintaining alliance relationships regardless of whether the relationships are perceived to be effective (i.e. satisfying, productive, and worthwhile). This finding suggests that buyers may be committed to making alliance relationships work over the long-term despite the ups and downs that may be encountered over the course of the relationship.

Achieving expected benefits from a logistics alliance positively increases *relationship effectiveness*. Achieving relationship benefits has a stronger positive influence on relationship effectiveness than trust. Conflict has a more negative impact on the effectiveness of the the

relationship than risk of opportunism. *Equity behavior*, such as sharing benefits and burdens, builds trust. Equity and trust decrease significantly the level of opportunistic risk. (Moore 1998)

The model of logistics alliances indicates that there are several ways third-parties can influence alliance success. Buyer's commitment to an alliance relationship is primarily a function of relationship conflict and a third-party's commitment. Equity behavior is essential for minimizing conflict. A third-party can reduce relationship commitment by using information exchange strategies. Failing to achieve expected benefits could create conflict and reduce a buyer's commitment to maintaining alliance relationships. Third parties should know exactly what benefits a buyer expects and be capable of providing them. (Moore 1998)

Losing Expertise in Logistics

Van Damme and Ploos van Amstel (1996) remind that, if a firm contracts out the logistics activites it runs the risk of losing expertise in logistics. Quinn and Hilmer (1994) have documented situations where loss of certain skills can be of high importance. Their examples are from manufacturing industry and a firm considering outsourcing logistics should define, if there are similar situations in logistics functions.

Quinn and Hilmer (1994) reported that many U.S. companies outsourced manufacture of what, at that time, seemed to be only minor components, and taught suppliers how to build them to needed quality standards. Later the suppliers were unable or unwilling to supply them as required. By then, the buying firm had lost the skills it needed to reenter the manufacturing.

Real problems can occur when the supplier's priorities do not match the buyer's. Unless the buyer's core competence is a true block to the marketplace, some suppliers, after building up their expertise with the buyer's support, will attempt to bypass the buyer directly in the marketplace. Careful definition, limitation, and implementation of means to remedy such external conflicts are critical in any but the most routine outsourcing arrangements. (Quinn & Hilmer 1994)

4.1.4 Conclusion

Logistics in the customer interface requires attention because of its high importance for the customer service. Monitoring and control of customer contact must be evaluated. The service evaluation should be based on the customer service policy and it should review the level of customer service in each alternative.

Customer feedback mechanism should be established and evaluated, if there are differences between in-house and outsourced operations. It is possible that the customer feedback reaches the firm less rapidly when the function is outsourced. The respond to changing customer desires should be evaluated. The importance of corporate image presented by warehousemen and drives has to be considered. It may be possible to give a certain value to the image presented by them. If the activity was outsourced the difference should be included in the evaluation.

There are various factors to be controlled in the logistics activities. The most important include personnel, equipment, price and capacity. If a firm keeps the activities in-house it bears the responsibility for these functions but it is also able to control them. The need for control in the supply chain may be high e.g. due to ensuring market access. Thus, control may play a key role in an outsourcing decision.

In addition, characteristics of logistics of a firm have also an effect on the decision. If a firm meets a changing demand either seasonally or geographically it is more favourable to have an outside carrier. It is possible that some of the activities have a changing demand while some are stable one. In that situation the outsourcing decision should be considered for each activity separate or for a bundle of activities with same characteristics.

The quickness for taking action in changing situations should be considered for each alternative. The level of uncertainty derives from fluctuations in demand and relationship, and from the risk of losing expertise in logistics. The uncertainty of the relationship is a key factor to the decision. The service provider's financial strength and personnel management must be evaluated. There is a risk of sharing confidential data with the service provider in case of

outsourcing and this risk must be evaluated. Trust and commitment in the relationship can reduce the risk related to outsourcing. To sum up, the general impacts of outsourcing are presented in Figure 4-3.

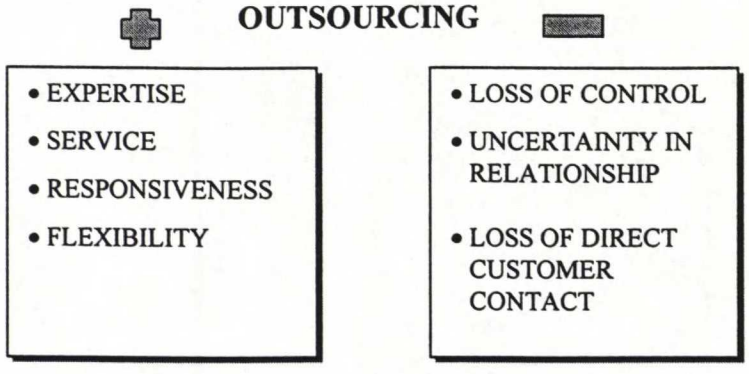

Figure 4-3 Qualitative Impacts of Outsourcing

4.2 Financial Approach to Outsourcing

In the second part of this chapter the outsourcing decision is discussed from the financial point of view. Firstly, the effect of the decision on the fixed costs is considered. Secondly, the importance of asset specificity and measurement in the decision is discussed. And finally, the problem of identifying relevant costs is discussed and some possible approaches to the problem are introduced. However, before discussing these subproblems a few issues have to be taken into account.

First, relevant costs for a firm are those that depend considerably on whether the activity is performed internally or outsourced. Critical to maintaining in-house capability in any activity is whether it provides cost-effective service at a quality level competitive in the marketplace. Outsourcing decisions are based, in part, upon the economics of producing firm's products or services. Accurate estimates of a product's or service's costs are therefore crucial for making outsourcing decisions that enhance the firm's competitive advantage and financial performance. Inaccurate estimates of costs can on one hand lead to outsourcing products or services that would be more economical to produce in-house and on the other to manufacturing those that would be more cost efficient to purchase. (Rao & Young 1994; Kee 1998)

Second, Andersson (1995, 147) suggests that the major groups of driving forces for logistics outsourcing are: 1) reduction of costs/investments and improvement of service, 2) improved strategic flexibility, and 3) need for structural change. He found that cost as an individual driving force is not significantly more important than any other, which doesn't correspond with previous research and general opinions (e.g. Bardi & Tracey 1991; Sink & Langley 1997). This view is taken in this study as well. We highlight the importance of analyzing the factors presented in previous chapter and combining these with the cost analysis.

Third, Sink and Langley (1997) observed that a proper identification of total logistics costs is difficult, as these expenses are often spread throughout the organization. Likewise, the benefits resulting from an in-house provision of logistical support services often are not readily apparent. This occurs because these activities are frequently viewed as cost generators rather than value-adding functions.

4.2.1 Variability of Costs and Specificity of Assets

Keeping logistics activities in-house calls for investments in buildings and internal and external means of transport. The capital employed cannot be used for other purposes. Of the logistics activities are outsourced, the capital can be invested into other activities. In addition, fixed costs are made variable. The shipper only pays for the service provider's output; which is particularly important for firms whose activities vary widely in volume from one year to another. This cost basis facilitates the budgeting and the allocation of logistics costs. (Fernie 1989; McFarlan & Nolan 1995; van Damme & Ploos van Amstel 1996).

A firm carrying out logistics activities in-house bears the responsibility for personal matters like recruitment, selection and training. Outsourcing logistics can be quite a relief for a firm and allows one to cut overhead. The evaluation of fixed and variable costs should be reviewed for all alternatives. Outsourcing may not significantly change the costs if the contract prices are fixed. Furthermore, a relevant factor in the analysis is the investments required. (Van Damme & Ploos van Amstel 1996)

Asset specificity

According to Aertsen (1992) asset specificity refers to the situation where both the firm and/or the selected supplier(s) need to engage in specific investments and develop proprietary know-how to make transactions possible. This occurs, for example, when a supplier needs to invest in highly specialized equipment for a unique buyer. If the contract were cancelled, the supplier would face substantial difficulties when attempting to use the firm's specific assets for other purpose. Cox (1996) has defined asset specificity moneral and thus, in terms of 'fitness for purpose' of skills, expertise or transactions in achieving sustainable position for the firm in a supply and value chain.

High asset specificity refers to the specific skills or knowledge of the organization, which contribute to the maintenance or creation of sustainable position for profit within specific supply and value chains. This interpretation is linked directly to the idea that firms have core competencies as was presented in the previous chapter. Such core skills or competencies are always of high asset specificity because in their absence the firm is unable to retain control of a sustainable position on a supply and value chain. These transactions should be undertaken within the firm if it is to retain its ability to make profits. *Low asset specificity* refers to those skills or expertise that are not key to the success of the firm and can be outsourced to those firms that are most competitive in the market on a relatively arms'-length basis. (Cox 1996; Kee 1998)

Medium asset specificity refers to complementary skills or expertise that are potentially significant to the sustainability of a firm's role but are not core competencies. Normally these skills can be outsourced although the type of contractual relationship and the closeness of the transactions to the firm used will be related to the relative degree of importance of the skills and expertise to the core competencies of the initial contracting firm. Complementary skills of medium asset specificity will be outsourced through close external contracts based on various forms of alliance. The nearer they are to core competencies of the firm, the more the firm will have to consider vertical integration. Figure 4-4 presents the relation of asset specificity and strategic importance to potential contract relationships. (Cox 1996)

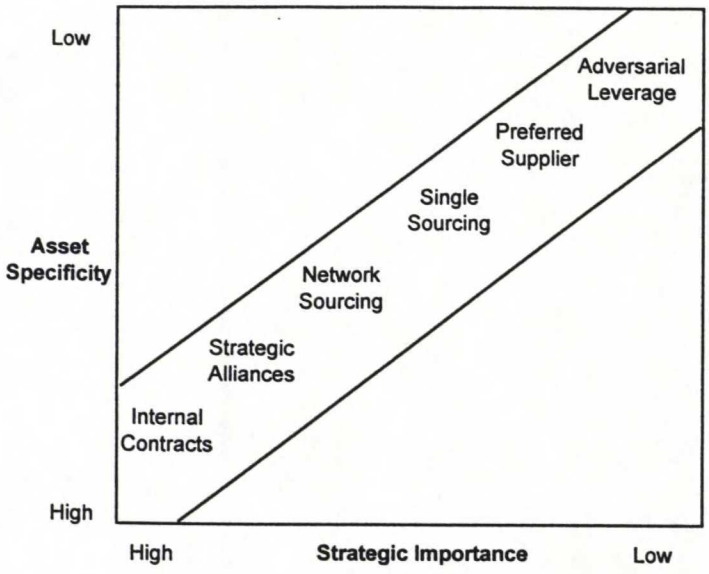

Figure 4-4: Potential Contract Relationships (modified Cox 1996)

Aertsen (1992) notes that the most stressed disadvantage of contract distribution is increased dependency. This is due to high switching costs associated with finding a substitute for the present logistics provider. According to Williamson (1975) it becomes increasingly difficult to change the supplier the higher the degree of asset specificity of a certain product or service. A situation characterized to be a high degree of uncertainty and asset specificy is best dealt within the firm. (Brandes et al. 1997)

When the physical distribution of goods is not accompanied by specific investments, it is possible to replace the distributor. However, the problem can arise that, during the execution of the contract, the contract distributor gains organization, task or transaction specific experience, for instance specific knowledge of transportation planning, service levels and customers. This form of specific investment is mainly related to what is called human asset specificity. Human assets can be tailored to the client and the customer. The client firm has its own particular operating procedures, formal and informal, to which the service provider must learn to adapt. (Aertsen 1992)

Driver-based learning is an example of specific assets. When the driver delivers or picks up daily he will be familiar with the customer's procedures. This knowledge increases the driver's efficiency for this specific customer but is not transferable to other customers. The risk of

losing such knowledge represents opportunity costs. The shipper may reduce the risk by vertical integration - performing logistics in-house. (Maltz 1993)

4.2.2 Performance Measurement

To explain under what conditions firms decide to contract out their physical distribution function, ease of measurement should also be taken into account. Ease of measurement can be translated into physical distribution terms by performance measurement. A transaction whose performance is clearly and unambiguously measurable offers ways to economize on bounded rationality (less uncertainty) while simultaneously safeguarding it against the hazards of opportunism (improved measurement). Ease of measurement is low in a standardized service. The choice between own-account distribution and contract distribution is dependent on two major factors, namely the degree of asset specificity and the ease of measurement as presented in Figure 4-5 (Aertsen 1992).

	Performance	
Assets	Measurable	Not measurable
Not specific	Contract out	Contract out (monitoring)
Specific	Contract out (safeguards)	Own-account

Figure 4-5: Degree of Asset Specificity in Relation to Ease of Measurement (Aertsen 1992)

Aertsen (1992) bases the outcome for contracting out (safeguards and monitoring) on the assumption that the labor costs in distribution service industry are lower than in any other industry and the form of the relationship. The safeguards will be built to protect the transaction-specific investments. In the second outcome the additional monitoring facilities (e.g. EDI network) are to limit the possibility of opportunistic behavior.

Actually the model from Aertsen (1993) is not applicable for the decision-making since he points out " When contracting out is preferred, the strength of the contractual relationship

varies with the level of asset specificity and the measurability of the performance". The decision is already made and he shows the implications to the relationship. The outcome is clear only in one alternative where asset specificity is high and the ease of measurable is low.

4.2.3 Costing methods

Sink and Langley (1997) have discussed the difficulty of identification of total logistics costs, as these expences are often spread throughout the organization. LaLonde and Pohlen (1996) point out that many firms lack the capability to determine the cost of moving its product to market and where potential savings may exist. They highlight the importance of being able to measure the cost of activities spanning the entire channel. Next three available tools for costing introduced by LaLonde and Pohlen (1996) are discussed.

Direct Product Profitability (DPP) identifies the profit contribution of products by taking into account the specific handling and space costs incurred by an item. The grocery trade initiated DPP as a pricing technique during the 1960s and 1970s. Retailers had traditionally relied on gross profit and gross margin for measuring performance which ignored how handling and storage costs can vary among items. DPP more accurately depicts product profitability by subtracting from gross margin those costs directly attributable to the product. DPP would include the cost of activities such as handling, freight, discounts, allowances, storage, and direct labor. However, DPP excludes fixed overhead costs such as supervision, facilities, management, purchasing, and inventory carrying cots. (LaLonde & Pohlen 1996)

Activity Based Costing (ABC) emerged during the 1980s as a means to more accurately assign costs within an organization. ABC evaluates the costs of a firm's activities based upon the actual resources and time consumed in performing them. It uses multiple drivers in assigning the costs. All costs are assumed to vary in direct proportion to the allocation basis. However, indirect costs frequently do not vary in direct proportion with labor hours, machine time or material consumption. ABC recognizes the different relationships and defines the right allocation basis for indirect costs. It thereby provides a more accurate estimate of the cost of the resources used. ABC has gained considerable attention as a potential tool for evaluating supply chain performance. (LaLonde & Pohlen 1996; Kee 1998; Liberatore & Miller 1998)

Total Cost of Ownership (TCO) presents a more recent attempt to cost a specific portion of the supply chain. The approach examines the cost associated with purchased goods and services throughout the entire supply chain and it attempts to look at life cycle costs. TCO provides the capability to assess how inter-firm relationships affect costs within the purchasing firm. It links supplier performance to specific activities performed throughout the purchasing firm and translates the activities into costs. (Ellram 1993; Ellram & Maltz 1995; LaLonde & Pohlen 1996;)

Total Cost of Relationship (TCR) for third-party logistics should include expenses for monitoring and recording supplier service to the final customer, whether by requesting proof of delivery, sampling order cycle time components, or other means. In addition, the outsourcing firm will need to monitor third-party performance. One facet of the logistics perform-or-purchase decisions is deciding whether in-house logistics is significantly cheaper to monitor because firm employees are more easily measured than third parties. (Maltz & Ellram 1997)

One alternative for comparing service quality is to estimate the cost for various kind of service failures, estimate the probability of failure under both internal and third-party logistics organizations, and then estimate the cost of service recovery under both internal and third-party regimes. Monitoring an interface where no firm employees participate - the logistics supplier/final customer transaction has to be included in monitoring costs. Before outsourcing, the shipper's own personnel would be directly in contact with the final customer. After outsourcing, day-to-day customer information may have to come through the third party, or firm sales force may take on new duties. Importance of this depends on what belongs to the firm employee's tasks. Costs to perform these functions must be included in the cost analysis. (Maltz & Ellram 1997)

4.2.4 Conclusion

Keeping logistics activities in-house a firm makes certain investments in buildings and transport facilities. This capital cannot be used to other purposes. By outsourcing the logistics function the fixed costs are made variable. The shipper pays only for the services it really uses. The shipper does not need any personnel for the recruitment, selection and training of the

logistics personnel. The differences in fixed and variable costs must be analyzed in the outsourcing decision. It depends on the contracts and characteristics of activities whether there are significant differences.

Furthermore, the specific resources and skills for a certain activity should be considered. If the resources or skills needed are specific, the opportunity costs for losing a contractor are high and the activity is best carried out in-house to lower the risk. The performance measurement should also be taken into account. The firm must monitor the activity according to the logistics requirements derived from customer service. If the logistics activity is standardized, the performance can be measured easily. Hence, these activities can be outsourced. If the activity changes and is not standardized the performance measurement is difficult and the uncertainty higher. These activities should therefore be undertaken in-house.

The importance of defining the relevant logistics cost was highlighted and different costing methods presented. A firm must consider which costing method is best suitable to its operations. In many organizations the logistics costs are spread throughout the organization and hence it is important to find all relevant costs.

To sum up, the general financial impacts of outsourcing are presented in Figure 4-6.

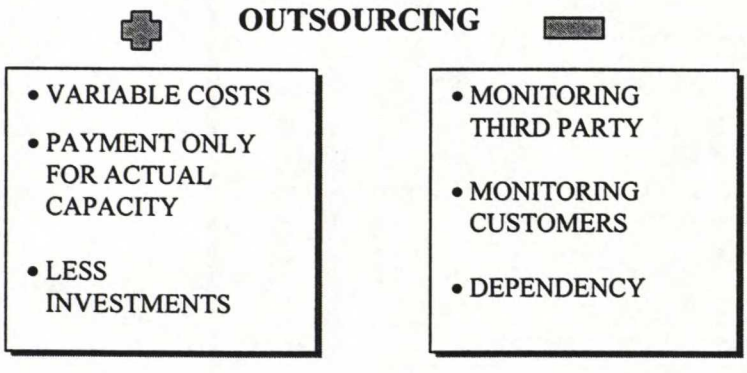

Figure 4-6 Financial Impacts of Outsourcing

5 THEORETICAL FRAMEWORK

This chapter presents the theoretical framework, which is based on the previous research reviewed in the theoretical part of the study. The logistics outsourcing decision-making is contingent on a wide range of factors. In the theoretical framework the factors are categorized and put to a sequence for the actual decision making. Two frameworks that address a similar research question may be found in the literature. These frameworks are presented in Appendix 1. However, contrasted with the framework of this study, the other frameworks are not so profound as this is.

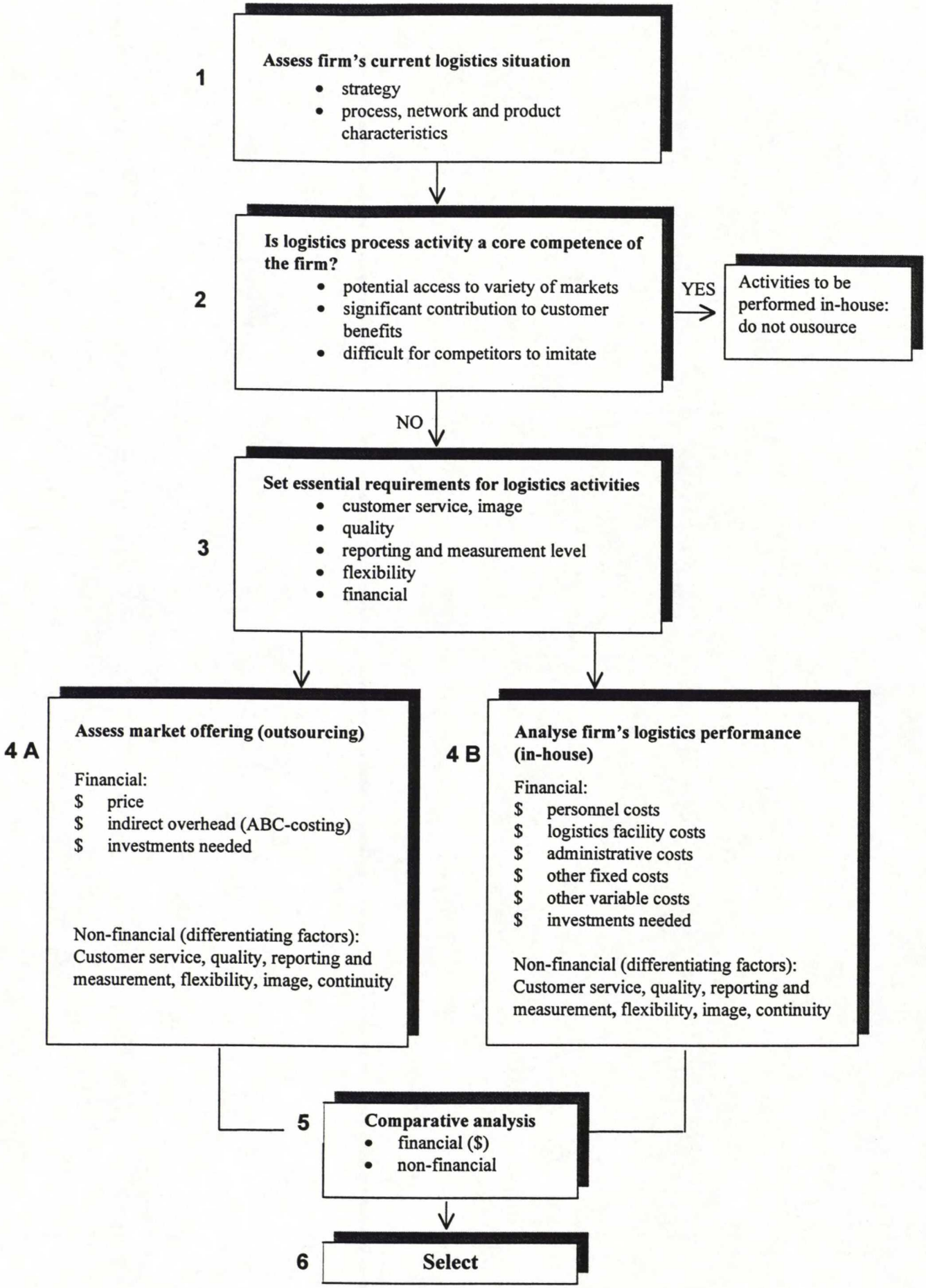

Figure 5-1 Theoretical Framework

1 Assessment of the current logistics situation

The decision as to whether a firm should outsource its logistics operations or not, begins with reviewing the current situation of logistics in the firm. A deep understanding of the logistics' need and the role of logistics service for a firm are important factors in the outsourcing decision. This analysis includes reviewing the strategy of the firm and its objectives regarding services and cost in logistics, the characteristics of the logistics processes, network and products. It is important that the logistics strategy supports the firm's overall goals. The firm may have very different processes, customers or products, which require particular solutions. If these differences are significant, the analysis may be conducted for each distinctive group separately.

2 Core Competence Analysis

As a basis for the outsourcing decision the core competencies of the firm have to be defined. The three tests from Prahalad and Hamel (1990) can be used in analyzing the core compentences. Firstly, a core competence should provide a potential access to a wide variety of markets. Secondly, it should make a significant contribution to the perceived customer benefits of the end product or service. Thirdly, a core competence should be difficult for competitors to imitate. The core competencies are to be performed in-house. Next the outsourcing question by defining asset specificity is addressed. It supplements the core competence approach by defining the contract relationships for non-core activities.

High asset specificity refers to the specific skills or knowledge of the organization, which contribute to the maintenance or creation of a sustainable position for profit within specific supply and value chains. These transactions should be undertaken within the firm if it is to retain its ability to make profits. *Low asset specificity* refers to those skills or expertise that are not key to success of the firm and hence can be outsourced to those firms that are most competitive in the market on a relatively arms'-length basis. (Cox 1996)

Medium asset specificity refers to complementary skills or expertise that are potentially significant to the sustainability of a firm's role but are not core competencies. Normally these skills can be outsourced. The type of contractual relationship and the closeness of the transactions to the firm used will be related to the relative degree of importance of the skills

and expertise to the core competencies of the initial contracting firm. Complementary skills of medium asset specificity will be outsourced through close external contracts based on various forms of alliance. The nearer they are to core competencies of the firm, the more the firm will have to consider vertical integration. Again, low asset specificity skills will be outsourced through arms'-length contracts using competitive market signals. (Cox 1996)

3 Setting essential requirements for logistics

The firm sets essential requirements for logistics activities. These are the minimum requirements which logistics services must fulfill. Logistics delivers customer service and thus, requirements set for customer service play an important role in logistics. The requirements differ from firm to firm and may consist of, e.g., the delivery time, accuracy or product availability. The quality of logistics service derives from reliability, responsiveness, customer satisfaction and employees. The requirements for quality need to be set as well.

The reporting and information level needed should also be classified. This has an effect on the necessity for control as well. If the service provider has a sufficient reporting and measurement system, there is little need for control operations in the firm. The need for flexibility derives from various factors and the firm should consider what are the possible causes for changes in demand for logistics are and how much flexibility is needed in each part of the supply chain. In addition, the firm may consider the financial factors to be included in the analysis.

After setting the minimum requirements for logistics, the firm defines whether there is such a service available in the market or if there is a partner willing to offer the service. If there is no possibility to buy the service in the market, the firm has to perform the logistics service in-house. If such service is available the following analysis will be made:

4 Qualitative and financial analysis

The first component in the analysis is a financial comparison. The firm defines the cost for performing logistics in-house. It may be difficult to find all the costs relating to logistics operations if the costing methods do not support it. The financial analysis for a market offering includes the price, variable costs of the shipper and possible investments necessary to enable use of the service provider.

For in-house performance the following costs must be included: personnel costs, logistics facility costs, administrative costs, other variable or fixed costs and the necessary investments. The question of necessary investments may be of great importance for the overall decision making. All components defined in the minimum requirements should be analyzed, which requires the analysis of the qualitative components as well. It is important to remember that only those functions that make a difference as to whether the service is performed by a service provider or in-house are to be included.

Qualitative factors to be analyzed are customer service, quality of the service, reporting and measurement, flexibility, image and continuity. These factors are difficult to compare if there are no clear requirements set. Furthermore, the requirements should be easy to measure. The qualitative components often act as differentiating factors between the alternatives. The service provider may be able to provide a faster transit time than an in-house service. The service provider may also have a better information system, which enables to provide more accurate information of the product flow's needs. These are only possible differences between the alternatives. The comparison must be made according to set requirements. As reviewed in the second and fourth chapter logistics plays a critical role in delivering customer service. Thus the level of customer service in each alternative must be evaluated. The quality component of the service is also important. One alternative may be able to provide a service level that exceeds the minimum requirements.

The corporate image is partly presented by the drivers and warehousemen. If the firm uses TPL provider or performs logistics in-house the effect on image must be analyzed. The question of continuity refers to the perspective of the different alternatives. Here the uncertainty of the relationship can be seen as well. If there are threats of discontinuity when using an outside provider or when performing logistics in house, the situation is to be considered. The continuity of performing logistics in-house can be exposed when large investments in, e.g., information systems are needed in order to keep logistics in house.

If the firm has already outsourced a part of its logistics services it can analyze the relationship with the service provider. The analysis of the relationship with the service provider demonstrates the level of uncertainty in the relationship and thus defines control requirements. Here the model presented by Moore (1998) can be used in identifying areas in the relationship which could be improved to increase trust and commitment in the relationship.

The final analysis must take into consideration both financial and qualitative factors. For some of the qualitative factors it may be possible to define a certain cost and include it in the financial comparison. The firm considering outsourcing must set weights on the various components in the analysis for the final decision.

6 CASE STUDY DHL INTERNATIONAL

The first part of this chapter details the methods used in the empirical part of the study. The second one introduces the case firm and the third one reviews the current situation in the parcel pick-up and delivery activities at DHL Finland. The fourth part defines the core competencies of the firm and the fifth part determines requirements for the analyzable activities and the components for each requirement. The final part addresses challenges in the current situation and details the background to the analysis presented in the following chapter.

6.1 Methodology

The theoretical part of the study discussed the crucial issue of making an outsourcing decision. The purpose of the theoretical part was to build a model for the decision-making. In the empirical part of the study the framework is used in the case study firm to be able to answer the question, whether the firm should outsource its logistics services or not. Based on the analysis managerial recommendations are made. At the same time the usefulness of the framework, and how far it can be generally applied, are addressed.

6.1.1 Justification of the Methodology

An outsourcing decision is contingent on a wide range of factors. Previous research focuses on descriptive studies regarding firms that already have outsourced logistics services. Because there is little research regarding the actual decision making, it was not possible to create strong hypotheses and to test the phenomenon with quantitative analysis. In this situation a case study approach gives sufficient information about the phenomenon studied.

The case study approach is a research strategy, which focuses on understanding the dynamics present within single settings (Eisenhardt 1989). Due to complexity of the research issue it is important to conduct an in-depth study to be able to understand all factors relevant for the decision. This further contributed to the use of the case study method.

There are at least four different applications for case studies. The most important is to explain causal links in real-life interventions that are too complex for the survey or experimental strategies. A second application is to describe real-life context in which an intervention has occurred. Thirdly, an evaluation can benefit from an illustrative case study of the intervention itself. Finally, the case study strategy may be used to explore those situations in which the intervention being evaluated has no clear, single set of outcomes. (Yin 1987, 25)

The case study method generally emphasizes qualitative, in-depth study of one or a small number of cases. Ellram (1996) stresses that case studies do not fit every research situation. She proposes that an excellent opportunity exists for using case study research methodology in many areas of logistics and purchasing. She includes the topic of understanding the decision-making process related to whether or not an organization outsources logistics activities to suitable situations of using case study methodology.

Perry (1998) stresses the importance of building a theoretical framework based on the prior theory in the theoretical part of the study. In this study a framework was build to enable focus on the critical issues regarding the research question in the data collection phase.

In the empirical part of the study an analytical and descriptive approach is used in describing the case study firm and the processes analyzed. Further, normative recommendations are given based on the analysis results.

6.1.2 Case Study Procedures

Data collection and analysis techniques are part of the process of the case study. Case studies typically combine data collection methods such as archives, interviews, questionnaires, and observations. The evidence may be qualitative, quantitative, or both. Triangulation, which is the use of the different techniques to study the same phenomenon, provides validity within the case study method. (Eisenhardt 1989; Ellram 1996)

In this study the primary data collection method used is interviewing and the data collected is mainly qualitative. Furthermore, customer satisfaction surveys and an image monitor survey

were used in defining the important elements of the service from the customer perspective. For the financial analysis, financial records and delivery information were gathered.

According to Perry (1998) there are no precise guides to the number of cases to be included. In this study we use a single case study method in order to carry out an in-depth study. According to Eisenhardt (1989) the cases may be chosen to replicate previous cases or extend emergent theory, or they may be chosen to fill theoretical categories and provide examples of polar types. According to Ellram (1996) a single case study is suitable when that case represents a critical case to test a well formulated theory, an extreme or unique case or a case which reveals a previously inaccessible phenomenon. A great deal of background preparation is required to minimize the probability of misrepresenting the single case and associated findings.

In this study the case firm was selected, because the service provider industry has not been studied in previous research on logistics outsourcing. The previous research focuses on the manufacturing industry and is therefore complemented by a case study from the service provider industry. The selected case firm is a provider of international air express services. In this study the background preparation was made by a thorough analysis of the previous research as well as by acquiring a deep understanding of the situation of the case study firm.

Interviews

Interviewed persons were selected from all important functions inside the case study firm to get a as wide perspective on the research issue as possible. Also all major subcontractors were interviewed. The selection was made with Mr. Tapio Ignatius, Operations Manager (DHL).

Some preliminary interviews were carried out in the case study firm in order to get information regarding logistics functions. In the preliminary phase five people from DHL and one subcontractor were interviewed and two stations outside Helsinki (Turku and Tampere) were visited. These interviews were not recorded, only notes were taken during the interview, because they served as a method of gaining an overall view to the outsourcing situation at DHL Finland and not as the main source of information.

In the actual field phase eight people from DHL and six people from subcontractors were interviewed. The interviewees are listed in the reference appendix. These interviews were recorded and written in text as soon as possible after the interview, thus at the same time as the fieldwork. The tapes were marked with the interviewee's name and date to provide easy identification of the various tapes. Interview questions were used in a systematic categorization of the interviews. The comments for each interview topic were gathered in the same paragraph.

An interview form used involved open-ended questions. The questions were based on the topics introduced in the theoretical framework, the topics stem from previous research. However, during the interview new questions and adjustments were added as was emphasized by Eisenhardt (1989). The purpose of the study was explained to each interviewed person before the interview in order to get better and more accurate answers.

6.1.3 Case Study Analysis, Reliability and Validity of the Study

Analysis was made according to the steps in theoretical framework. Analysis begins with an assessment of the current situation and core competence analysis. Next requirements for logistics activities were set and the actual comparative analysis was made. The analysis consisted of both qualitative and quantitative parts. The qualitative components analyzed were defined based on the interviews. Financial analysis was made based on the actual financial records and defining the cost structures for new activities.

Reliability addresses the repeatability of the experiment and whether replication is possible and will achieve the same results (Ellram 1996). In this study an interview protocol was used (Appendix 2-3) and the procedures used were described (6.2). Interviews were recorded in order to lessen the randomization in data collection. Furthermore, several visits to the case study firm were made and the interviews of subcontractors were made on site. Interviewed persons were selected according to their expertise in the topic studied.

External validity is an issue that must be addressed during the design of the research. External validity reflects how accurately the results represent the phenomenon studied, establishing generalizability of results. (Ellram 1996) Generalizability is better for multiple case study

results than for a single case study result (Ellram 1996), as is the case in this research. To strengthen the generalizability the theoretical framework is built based on previous research.

Construct validity addresses establishment of the proper operational measures for the concepts being studied. Yin (1987, 36) identifies three elements of the construct validity: using multiple sources of evidence, establishing a chain of evidence, and having key informants review the case study research. In this study triangulation was gained through asking several persons interviewed the same question and by using multiple sources of information. According to Yin (1987, 91) any finding or conclusion in a case study is likely to be much more convincing and accurate if it is based on several different sources of information. In this, study besides interviews archival records regarding cost structure in logistics operations and shipments were used.

6.2 Case Study Firm Introduction

The purpose of the empirical part of the study is to test and explore the theoretical findings by using the theoretical framework in the analysis of pick-up and delivery processes at DHL Finland. Based on the analysis normative recommendations are given with regard to outsourcing decisions. The empirical part of the study will follow the structure of the framework that was created in the chapter five.

DHL Worldwide Express is an international express firm, which operates in over 200 countries. The international DHL network consists of hubs, gateways and logistics centers and enables next-day delivery almost anywhere in the world. DHL International Oy (DHL Finland) was established in 1982 as the first international express firm in Finland. DHL Finland operates today at two gateways, one being at Helsinki-Vantaa airport and the other at Tampere-Pirkkala airport. This study focuses on the inland operations of DHL Finland.

The global competition in express services is mainly concentrated in the hands of a few global firms. The competitors in the worldwide scale are DHL, TNT, United Parcel Services (UPS) and Federal Express. In the Finnish and European scale TNT, UPS, and DHL are dominating players in the market. Finland is a geographically wide and fragmented country and therefore shipment flows are thin in remote areas. As a result, all express companies operate with

subcontractors in Finland. In Finland TNT and FedEx only operate through subcontractors in parcel pick-up and delivery. UPS uses both its own couriers and subcontractors, as does DHL Finland.

The organization of DHL Finland is divided into two districts: southern and northern. The districts are further divided into five stations, which operate is different geographical areas. The stations bear the responsibility for sales and operations. The Helsinki and Espoo stations form the southern district and all other parts of the country belong to the northern district. The Helsinki station is responsible for the Helsinki area and the southeastern part of Finland. The Espoo station is responsible for Espoo area and southwestern part of Finland.

The Turku station bears the responsibility for Turku and western Finland. The Tampere station is responsible for Tampere, Jyväskylä and the neighborhood areas. The southern district and northern Finland are served from the gateway at Helsinki-Vantaa airport. The gateway at Tampere-Pirkkala serves the Tampere and Turku stations. DHL Finland has sales offices in Helsinki, Turku, Tampere and Oulu.

6.3 Current Logistics Configuration at DHL Finland

6.3.1 Service Strategy

DHL offers international express services and hence its service strategy is to deliver a shipment as quickly as possible from door to door, in good shape and in reliable fashion. The aim is to offer the best door-to-door express service regardless of distance with largest geographical scope, latest pick-up and earliest delivery times. Its strategy does not comprise competition on price, because a customer is willing to pay a premium when s/he can trust DHL. The aim is to give value for money and to deliver a premium service.

The core business of DHL is international express service. To support and facilitate the core service DHL offers various complementary services. The most important facilitating services are customer service and forwarding.

Critical competitive elements in the industry include, based on experience, delivery reliability, price/quality- ratio, shipment information, and speed of delivery and ease of use. Importance of shipment information is increasing steadily. As all express companies are able to transport shipments in a quite similar way, differences in performance exist in the ability to provide on-line shipment information. DHL differentiates itself from other express companies through customer service, since DHL is able to provide a constant service level in all parts of the world. The competitors are not always able to provide a stable service level in all parts of the world.

An express service is easily exposed to interruptions. Customers are more loyal to a firm with a strong image, as they do not react easily to occasional problems and therefore image is also extremely important in the competition. The image of DHL consists of four components: quick, easy to use, reliable and international. These attributes have partly become a matter of course in the industry. It is assumed that flexibility of services will gain importance in the future and DHL has to look more carefully at the basic components of the service offered and find sources for differentiation. DHL has an image of high quality service, which stresses the importance of successful logistics operations.

In Finland DHL is the market leader in international express services. Furthermore, DHL holds the image leadership. However, the competitors have come closer in image. If a customer perceives all express companies as being close in image, the difference in service must be gained in other areas. DHL's marketing communication efforts to strengthen its image include newspaper and radio advertisement, sponsoring, and customer occasions.

Today companies other than express companies are able to provide next day delivery in Europe, which has affected the competitive situation since the prices of such institutions as the Post are much lower than those of express companies. The future competition is supposed to increase even more between the current express companies and new service providers. The challenge for DHL will be in maintaining a higher price level also into the future. It is assumed that service differentiation will gain importance and possible sources for this are price/quality-ratio, flexibility and cresting of specialized services for different customer segments.

6.3.2 Logistics Operations

The global distribution channel of DHL can be divided into three parts; the country of origin, international network and the destination country. This study concentrates on country operations related to parcel pick-up and delivery activities in Finland. In these operations there is a need for two kinds of transportation services: pick-up and delivery and line-hauls. Further the term delivery is used as a general term for these activities.

Time compression in the supply chain is high since, in express service, time is the critical component of the service offered. The transportation process is complicated with a large number of tasks (Figures 6-1, 6-2) which have to be performed and coordinated within a short span of time. The inbound (delivery) and outbound (pick-up) processes in Finland are described in the following figures.

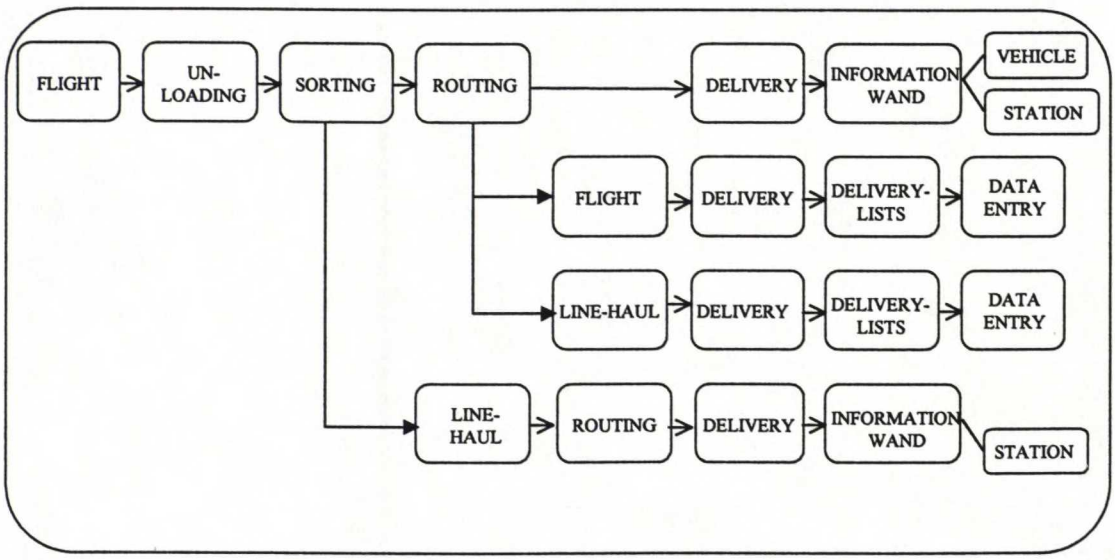

Figure 6-1 Inbound process

An inbound process begins as an international flight arrives from a hub. A hub is a central sorting and receiving facility where different regions of the global network are connected via international flights. The flight delivers shipments to the gateway where the plane is unloaded. Next the shipments are sorted according to the geographical area and directed to the right delivery route or shipped by a line-haul or domestic flight to the destination area. After an actual delivery to a customer shipment information will be submitted to the central information

system. Submitting may occur either manually from delivery lists or directly from a barcode reader (a wand). If the vehicle used is equipped with special technology, information is submitted on-line to the information system, otherwise the information is submitted at the station, after the vehicle returns to the station. Manual entry of shipment information is the slowest way. The speed of submitting information influences the level of customer service and the quality of the service.

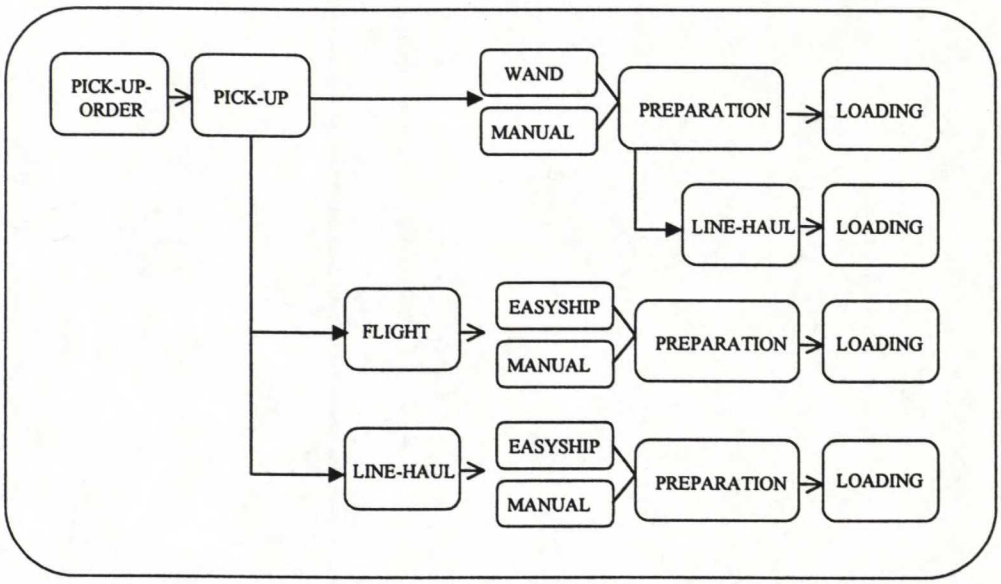

Figure 6-2 Outbound process

An outbound process begins with a customer call at a customer service center for a pick-up order. Then the call center delivers the order to a courier either on-line or by phone. Next the courier picks up the shipment and shipment information is submitted as in the inbound process. Easyship is a computer system that a customer uses for making pick-up orders. Shipment preparation is the final phase before loading. In this phase each shipment is completed according to the customs procedures and operational handling. The time needed for preparation depends partly on previous phases, because if the information of each shipment is not already submitted, it needs to be entered manually to the information system and requires more time in the process.

Shipment Distribution

The geographical dispersion of customers in Finland and the large number of customers create a highly complex transportation network. Most of the customers are firms and therefore most of the customers are located in cities and in the southern part of Finland. Although the most shipments center in cities and in remote areas the shipments volumes are thin, all areas are, according to the service strategy, to be served as well as possible. Due to long distances between cities in Finland, the time for transporting shipments from a gateway to the destination area may take several hours. A service window for each area is the time between shipment arrival and departure and hence the actual time for pick-ups and deliveries in that area.

The dispersion of customers influences cost/service tradeoffs that are also essential to the outsourcing consideration. In principle a subcontractor is able to combine product flows of several clients and thus provide a better cost/service ratio in remote areas than an in-house alternative. This derives from large distances combined with low shipment volumes, which require a large number of vehicles in the area in order to enable transport the shipments within the service window. Table 6-1 presents the distribution of shipments between the geographical areas and shows the significant differences between them.

Table 6-1 Distribution of Shipments

Area	Delivery	Pick-up
Helsinki + Vantaa	42 %	42 %
Espoo	13 %	14 %
Tampere and Jyväskylä areas	12 %	13 %
Turku area	8 %	8 %
Other Helsinki station	9 %	10 %
Northern Finland	7 %	9 %
Western Finland	3 %	4 %
Other Espoo station	3 %	3 %

As shown in Table 6-3 a major part of the shipments center in the Helsinki and its neighborhood area (55%). Together with other parts of southern Finland the share of shipments accounts for 70% of all shipments. The remaining 30% of shipments are distributed to the rest of the country, and results in very thin shipment flows compared with the southern Finland.

6.3.3 Use of Subcontractors

DHL has used subcontractors ever since it began operating in Finland. The experience of using subcontractors helps in analyzing the outsourcing decision, since subcontractors and their methods of operation are known. Currently DHL Finland has 17 of its own couriers in the Helsinki area. Subcontractors handle all other areas. Most subcontractors operate regularly, but in the south a large number of subcontractors is used on an ad-hoc basis. They are generally used as back-ups when a DHL courier is absent or for volume peak times such as in Christmas. All the major subcontractors shall be presented next.

Cargo Express (CE) is the biggest transportation firm of express services in Finland. More precisely it is the only firm that offers express services to the whole country. It only operates in the domestic market. CE belongs to the BTL Schenker Group, which owns companies such as Scansped, Huolintakeskus, Kiitolinja and Wilson. The turnover of CE was 71 mmk in 1998. CE has 70 of its own vehicles and 100 drivers, in addition it uses the services of 50 subcontractors. These subcontractors operate under the logo of CE.

Lähettiykkönen operates in the Turku area. It owns 14 vehicles and has 20 employees. Its' turnover was 4,4 mmk in 07/97-06/98. *Lähettipirkka* operates in the Tampere area. It ows 26 vehicles and has 36 drivers. Its' turnover was 10 mmk in 1998. *Keski-Suomen Tavaralähetit* operates in the Jyväskylä area. It does not own any vehicles but has 16 co-operators in the area. Its' turnover was 5,5 mmk in 1998.

Backman-Trummer (BT) is a large forwarder and has its central office in Vaasa. BT offers a large number of transportation services and is DHL's agent in the area. It bears the responsibility for sales and operations. BT does not have any of its own vehicles, but it uses a subcontractor for delivery activities. Its' turnover is 200 mmk and DHL's share of it is not significant. Because of the different nature of the co-operation with BT, its operations are not included in the analysis since it would also include the outsourcing of other areas than delivery activities.

6.3.4 Relationships with Subcontractors

All subcontractors are the biggest service providers in domestic express services in their areas. DHL is the most important client for all major subcontractors. Co-operation with subcontractors has a long tradition and has existed as long as for 10-15 years. Subcontractors regard the co-operation with DHL as of high importance to their local image and are proud of their relationship with DHL. Subcontractors partly use DHL's logo in vehicles and on the clothes of couriers.

The speed and quality requirements for DHL's shipments are stricter than for the other services of the subcontractors. DHL's customers have paid for a high level of quality in service and the operations of a subcontractor should also fulfill these requirements, although they may exceed their normal requirements for operations. Due to the high standards promised to customers, no failures should occur in pick-up and delivery and therefore the subcontractors bear a great deal of responsibility. Local subcontractors bear the total responsibility for operations it that area. In southern Finland, the subcontractors' couriers are supervised at the gateway by DHL.

Interviews showed that generally both sides, DHL and all subcontractors, are satisfied with the current relationships. Furthermore, all subcontractors are willing to develop a closer relationship with DHL and they are also willing to invest in the relationship. As was reviewed in the section that described DHL's organization, each station bears the responsibility for operations in the area. Thus, stations deal relationships with subcontractors and no centralized treatment exists.

The lack of proper contracts complicates the co-operation with subcontractors. The performance expected of them, an how it will be monitored, is not clearly defined. Many conflict situations have derived from insufficient information or instructions. Also little follow-up is conducted by DHL. This is partly due to the changing situation of the delivery need, which makes it difficult to compare delivery records over time.

All subcontractors take an open view regarding information exchange and are willing to improve the relationship and their operations according to the needs of DHL. However, DHL seldom requires any information of their operations or plans for future changes. The lack of common sharing of future plans is regarded as somewhat negative for the subcontractors. Information exchange regarding changes in operations has also been problematic and it has often happened that subcontractors receive notice of changes in services too late.

All subcontractors are highly committed to the relationship, which partly derives from DHL being the biggest client for all of them. Trust and commitment are generally high in the relationships with subcontractors, although commitment to the relationship seems to be higher at the side of subcontractors than of DHL. High level of trust and commitment decrease the level of risk relating to the outsourcing decision. DHL shows a high level of trust in the relationships with subcontractors since it leaves them a lot of responsibility.

6.3.5 Challenges in the Current Situation

The outsourcing of delivery activities has been the normal way of action at DHL Finland. When DHL Finland began its operations the shipment volumes outside the Helsinki were very thin. For cost reasons the original outsourcing decisions were more or less the only possibility for action.

In recent years, the shipment volumes in Finland have increased steadily by an annual rate of 20-30%, which has strongly influenced the need for delivery services. Growth in shipment volumes has also changed the role of subcontractors. Today the number of shipments delivered by subcontractors is gaining importance of the total share of operations. This situation has created a need for a closer analysis of the current outsourcing situation.

It is expected that shipment volumes will further increase and thereby create new situations for outsourcing decisions. To enable future decision-making it is highly important to create an analysis tool for the outsourcing decisions. In addition it is essential to have an understanding of the activities or areas, which are more likely to become preferable for a change to an in-house or an outsourcing alternative.

Currently DHL uses both its own couriers and subcontractors for delivery activities. Although the subcontracting is regarded positively and DHL has been satisfied with the current subcontractors, this area is in need for further development, according to the interviewees. In addition, the global concept of the firm has a preference for own couriers and requires a particular ground for the use of subcontractors.

Also the need for information of the actual situation regarding outsourcing was an important motive for this study. The aim is to review the current situation and to define the actual expenses. Firstly, to define the expenses for an own courier and for vehicles used and secondly, to define the actual expenses of subcontractors. It was also unclear whether the price paid for a subcontractor's services is moderate. In order to respond to this question a comparative cost calculation for performing those activities in-house is carried out. The lack of reporting requirements for subcontractors also created a need for gaining a view of the activities performed by them.

Moreover, one motive for this study was the need for gaining information of the subcontractors being used. This was in order to be able to plan for the future and to review their attitude and ability for future growth. Also the need for gaining feedback of the current relationships in order to define the areas for improvement in the relationships contributed the study.

Some problems with the current relationships exist. Process failures occur more often through subcontractors that through own couriers, although the number of failures is not substantial. This is partly due to the low level of general knowledge of DHL's services by subcontractors. Another problem is the question of responsibility, because it is not always clear who bears it. It is also sometimes unclear who gives orders to subcontractors' couriers, whether DHL or subcontractors supervise them.

A need for defining the service level of subcontractors also exists. It is known to be generally lower than for an in-house alternative but it is not clear in which areas it differs from the one at DHL. However, it has to be remembered that the service level of a subcontractor is partly affected by DHL's decisions. This addresses for example investments in information technology and organizing of training.

To sum up, this study is generally motivated by the need for more information for future outsourcing decisions. The purpose of the analysis carried out in the analysis chapter is to identify which of the current operations are more preferable to perform in-house and which are more preferable to outsource. Chapter seven addresses the analysis carried out for the delivery activities.

6.4 Core Competencies of DHL

In the analysis of core competencies the global distribution network is taken into consideration, since the inland operations in Finland are closely related to the global network. The core competencies of DHL are defined by using the criteria of Prahalad and Hamel (1990). According to them three core competencies of DHL were identified. Each of them is explained as follows.

The global infrastructure of DHL (hub and spoke system, control and efficiency in operations) does create potential access to a variety of markets, because it reaches all parts of the world. The global infrastructure creates a contribution to customer benefits, since it shortens the delivery time radically and provides reliability. Competitors could imitate the infrastructure, but it would require very large investments and take time. The global infrastructure can be defined as physical asset specificity since the hub and spoke system is a technological solution.

Global service standards provide potential access to a variety of markets since a shipper can trust that the standards are the same everywhere in the world. As a result, they create customer value at the same time. Standards are a common operations model, which has significance for the firm's service brand as well. Service standards can be defined as human asset specificity since they account from organizational routines and culture. Service standards are difficult for competitors to imitate since they are a part of system of action in the organization.

The global information system can also be defined as a core competence and regarded as dedicated assets, which are specific to DHL's operations. The global information system enables global markets to be reached and is built over time and is therefore difficult to imitate.

The global information system provides on-time information regarding all shipments in the network and thereby creates customer benefits.

Next the relation of delivery activities to the core competencies of the firm is analyzed by using the asset specificity criteria. The analysis is presented in Figure 6-3.

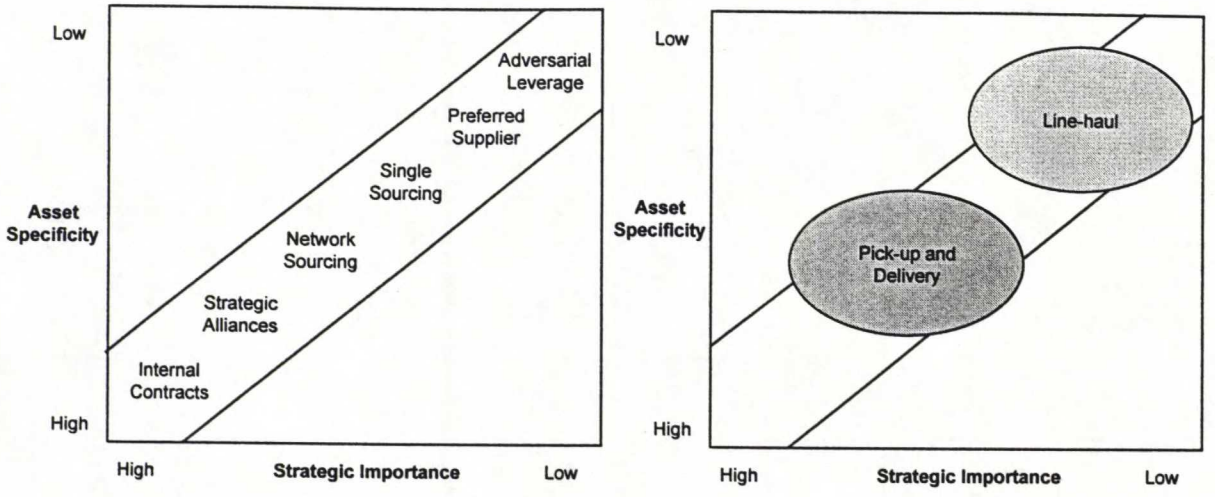

Figure 6-3 Analyzing Logistics Activities

Pick-up and delivery activities can be defined as being of medium asset specificity, since they complement the core competencies and therefore are of relative degree of importance to the core competencies. According to this analysis these activities can be outsourced, but since they are closely related to the core competencies of the firm, the control over these activities have to be kept in-house. Also an outsourcing relationship has to be closer than an adversarial relationship. Control over a specific activity can be gained in the outsourcing alternative through contract agreements or in this case through an on-line system and thus, if control cannot be gained through these methods, the activity should be performed in-house.

The need for control in the operations is intensified by the fact that there are thousands of contacts with couriers and customers each day. The number of customer contacts with couriers is relatively high compared with 800-850 phone calls in customer service a day and 20 customer visits by sales persons a day. A courier is often an important contact for the customer, which makes control in these activities even more important.

The service requirements are higher and often different from those of subcontractors' own and therefore do not enable an adversarial leverage relationship with a subcontractor. Requirements for line-hauls are not as strict as for pick-up and delivery and thus the control requirements for those are lower and enable a looser relationship. However, many line-hauls comprise both pick-ups and deliveries. A pure line-haul service allows an adversarial leverage.

6.5 Setting Essential Requirements for Logistics

This section addresses the setting of essential requirements for logistics activities. The requirements and weighting for these activities are derived partly from customer satisfaction surveys and partly from the interviews conducted. Each component is weighted according to its importance on the overall service level.

The customer satisfaction surveys of DHL are carried out by and research agent, Taloustutkimus Oy. Customer satisfaction of DHL Finland is measured for each customer segment, but a geographical division is made only between the south and the north, which makes it impossible to measure actual differences in service levels between own couriers and subcontractors. But a clear result from the survey was that the satisfaction for areas relating to deliveries is considerably lower in the north than in the south. And because in the north only subcontractors are used, the survey seems to indicate that the service performance of subcontractors is lower than of DHL's own couriers. This is also the opinion of interviewees at DHL.

The customer satisfaction survey measures the importance of different service components to the overall customer satisfaction and therefore also addresses the most important characteristics of the service. The service offered consists of several components that all have an impact on customer satisfaction. In the formation of overall customer satisfaction the share of the following components was measured equally: flexibility of services, couriers, and pick-up and delivery. Shipment information was regarded as less important.

In the following an ideal situation for the delivery activities will be set. The qualitative analysis evaluates the service level for each alternative and when compared with a cost analysis, it creates a cost/service trade-off. Each alternative is measured in the following chapter using the criteria set in this section. The evaluation of each alternative is made as percentage of fulfillment in each criteria.

6.5.1 Customer Service Requirements

Speed of deliveries is the most important character of the service since it is the core of the service offered. However, it accounts for operations in the whole distribution channel, but successful inland operations are also essential to it. The speed of deliveries in country operations derives mainly from the amount of vehicles used for transportation.

Couriers are an essential part of the service process. In the customer satisfaction survey the following characteristics of couriers are addressed: helpfulness, general knowledge of DHL's services, efficiency and general behavior. General knowledge of DHL's services can be obtained through training and experience. Since the other characteristics of couriers are difficult to evaluate without a specific customer satisfaction survey regarding each subcontractor, we have adopted another way for the evaluation. We use recruitment criteria as a tool for assessing possible differences in couriers.

DHL emphasizes the following criteria in recruitment of couriers: willingness to serve, positive attitude towards customer service, good physical condition, and knowledge of languages (English as minimum). Prior experience from driving is not regarded important and can even be regarded negatively, depending on what kind of experience it is. A courier should be motivated and proud of his/her work.

An *image* monitor survey is carried out for DHL. It measures how well known DHL is among express service customers in Finland and from where these customers remember the name of the firm. However, it does not measure the impact of each marketing communication method and therefore, the importance of the image presented by couriers and vehicles to the overall image could not be weighted. Customer satisfaction survey shows that customer value the

uniformity of couriers as being important. For this analysis a view that vehicles and couriers represent one type of advertising is adopted and it should be regarded as a part of the customer service. The image of DHL is partly presented by couriers and vehicles, which operate in the colors of DHL. In order to have the image properly in view all couriers and vehicles that deliver DHL's shipments should be in the colors of DHL.

Weighting of these components is carried out according to the comments of interviewees and customer satisfaction results and presented in the following. Since these components contribute strongly to the total service, the customer service component is weighted as 60% of the total service.

Evaluate:

- delivery speed 40%
- recruitment criteria 20%
- general knowledge 20%
- image presented by couriers 10%
- image presented by vehicles 10%

6.5.2 Quality Requirements

The quality of the pick-up and delivery activities derives from several components and it is difficult to measure as an individual factor. It includes delivery speed (no delays), accuracy of pick-up time, accuracy of delivery place (address), condition of a shipment when delivered and speed of submitting shipment information. The target is to have no deviation is services regarding these areas.

It is difficult to define how to compare in-house and outsourcing alternatives for the quality aspect since there are only a few customer complaints concerning these attributes. The aspects concerning the performance of employees were addressed in the previous component. Problem of quality assurance increases the need of trust in the relationship if the activity is outsourced, although the quality assurance of DHL's own delivery operations face the same problem.

6.5.3 Information and Reporting Requirements

The delivery activities complement the core competencies, as was analyzed in the previous chapter and therefore a relatively high control level is required for these activities. The control in activities can be gained through a contractual agreement or a high level of information technology in vehicles. A high level of information technology allows control of each individual shipment on-line.

Adding information technology facilities into a vehicle can increase the level of customer service. A high level of information technology makes the submitting of delivery information faster and improves communication with couriers regarding changes in deliveries. Investments in information technology may also decrease the number of inquires at the service call center and reduce the amount of shipment tracings, since a customer would be able to trace the shipment via Internet.

Submitting of information occurs either manually or on-line, as was described in the delivery process description. In an ideal situation each vehicle is supplied with an on-line information system, each courier uses barcode reader and has a cellular phone for communication. This results in the fastest submitting of shipment information and provides the best service level in this component for a customer. It also reduces manual work in the preparation phase at the gateway and thereby decreases overhead costs. Currently there are no reporting requirements set either for own couriers for subcontractors.

Shipment information was regarded as of lower importance to the customer satisfaction. On the contrary, the interviewees at DHL regard shipment information as one of the most important attributes of the service offered. As a combination of these views, in this analysis shipment information is weighted as 30% of the total service.

Evaluate:

- submitting of delivery information (information technology)

6.5.4 Flexibility Requirements

Flexibility of services, which was rated as an essential factor to the overall customer satisfaction, derives from many components of the service offered (e.g. price, salespersons, customer service). Here only the need for flexibility in logistics operations is addressed and therefore the weight on this analysis is somewhat insignificant (10%).

A need for flexibility in these activities derives from changes in logistics demand, i.e. in the number of shipments, and from changes in other operations e.g. from changes in flight schedule. Changes in demand result from lost customers and changes in customers' delivery needs. A change in flight schedule decreases the service window in Finland. There are also changes in service demand that are related to specific seasons. However, the impact of different seasons is not significant.

Flexibility in logistics activities can be partly gained through a larger number of vehicles in use. It results in a way to respond to the changes in demand and to be flexible. A part of the flexibility derives from the service attitude in the organization, how flexible the organization responds to specific and changing needs in operations, however, this aspect is not included in the analysis. Also the service time of a service provider has an impact on the flexibility. The longer service time offered, the more feasible is a flexible responses to changes.

Evaluate:

- number of vehicles and drivers
- ability to increase the capacity
- service time

6.5.5 Financial Requirements

The shipment transportation is a part of the core of the DHL's business and therefore, cost savings in these activities contribute directly to the financial result. The aim is to minimize costs in these activities, but as was identified earlier in this chapter this study is directed in defining a cost/service trade-off. Since service requirements exist they have to be considered simultaneously with a cost analysis. The cost analysis is regarded to be as important as the qualitative analysis.

Variability of cost is another important character of a cost structure for logistics operations. Expenditure are almost constant if DHL uses its own couriers. But with certain subcontractors the accrual basis is variable i.e. it is defined according to the shipment volumes. If the cost is variable it results in a lower risk level since the cost varies according to actual shipment volumes. An *overhead* from the operations derives firstly from a commission, which some subcontractors receive in addition to their invoicing. Secondly, an overhead may derive from a lower level of information technology, which creates additional work at the gateway operations.

Evaluate:

- cost
- variability of cost
- overhead

6.6 Conclusion

This chapter introduced the case firm and its logistics operations, which are analyzed in this study. Three core competencies of the company were identified, namely global infrastructure, global service standards, and global information technology. In order to identify the role of the delivery activities in relation to the core competencies, they were analyzed according to asset specificity. The pick-up and delivery activities can be regarded as of medium asset specificity, since they complement the core competencies. In these activities it is essential to retain the control in-house to sustain the core competencies. Pure line-hauls can be regarded as of low asset specificity and therefore an adversarial leverage is allowed.

The final part of the chapter addressed setting of essential requirements for the delivery activities. For the case firm an ideal situation was created in order to be able to review of cost/service ratios for different alternatives in the geographical areas. The components set in this chapter are the basis for the following analysis chapter.

To sum up, the importance of the components in the qualitative analysis in Figure 6-5. The customer service component is weighted as 60% , the information component as 30%, and the flexibility component as 10% of the total service offered. The cost analysis is weighted to be as important as the qualitative analysis.

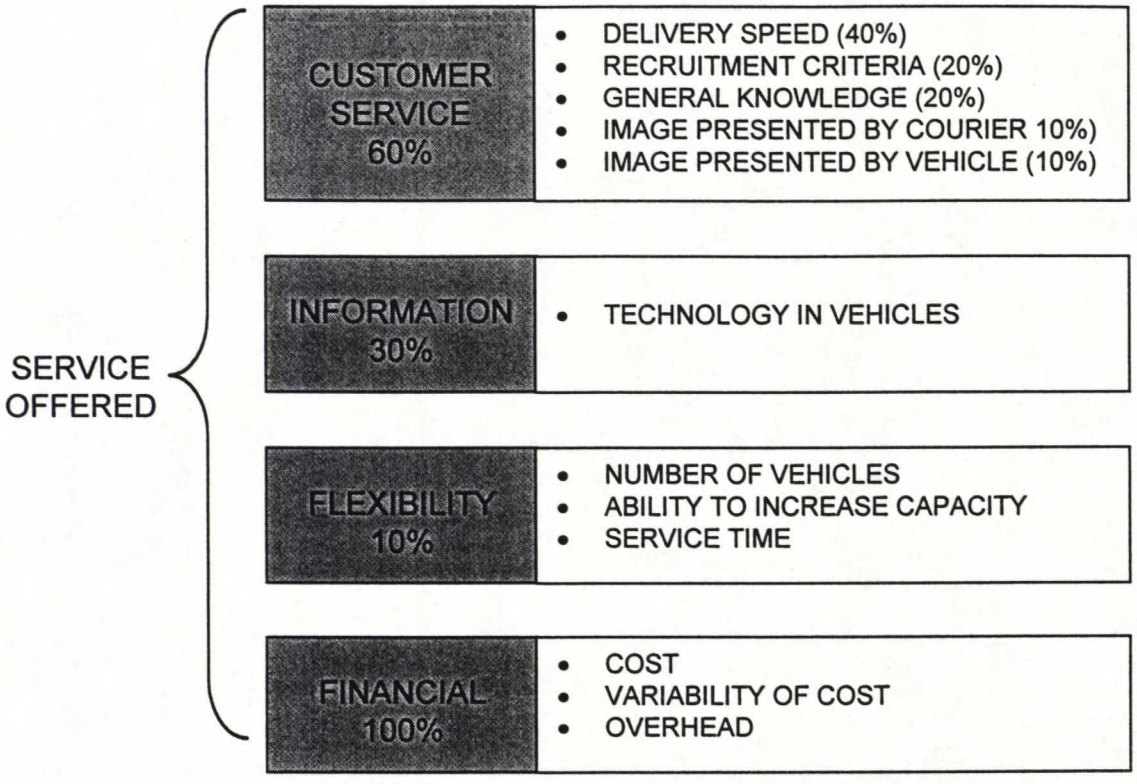

Figure 6-4 Components for the Comparative analysis

7 ANALYSIS

This chapter compares in-house and outsourcing alternatives according to the requirements already set in the previous chapter. A cost analysis is also included. The activities analyzed are the delivery activities, which were already presented in the previous chapter.

On principle it does not change the service process or any other processes in the organization, whether a DHL's own courier or a subcontractor performs the service. The effects of outsourcing on the organization derive generally from qualitative and cost differences and from some changes in administration.

7.1 Analysis Methods

In this section the methods used in the cost and qualitative analysis are defined. The qualitative analysis addresses the areas important for customer satisfaction that were defined in the previous chapter. The measurement is carried out according to the explanation presented as follows and an additional explanation for each area is unnecessary.

Cost calculation

The cost calculation is carried out for each geographical area regardless as to whether it is currently managed by a subcontractor or in-house. This is in order to create an ideal situation and to compare the alternatives.

The cost for the in-house alternative is calculated based on current information on wages and absence rates of DHL's couriers. When a courier is absent a subcontractor is used and this cost is included in the total costs. A fixed amount for each month is added for the handling of wage payment. In addition, in those areas, where a courier works longer than 8 hours a day, extra free days are included in the costs. And in those areas, where the working day is longer than 10 hours also a daily allowance is also included in total costs. In the logistics facility costs the following components are included: leasing, repair and maintenance, fuel, taxes, and insurance. The amount of each is calculated based on the current expenditures.

For those areas that are at currently operated by a subcontractor an estimate of the necessary amount of own couriers is made according to the specialists interviewed at DHL. Since different vehicles are also needed for some operations currently performed by a subcontractor, the leasing cost was calculated according to estimated purchase price, usage time and residual value. The operating expenditures of vehicles were estimated according to the length of the route i.e. the amount of driving kilometers each day.

The cost and accrual basis for subcontractors' operations is known. For those activities currently performed in-house the cost for an outsourcing alternative is based on the accrual basis of a subcontractor for a similar activity in the area. In those areas where the cost is defined on a variable basis, an estimate of the shipment volumes in the area is used in the cost calculation. An overhead derived from a commission or local operations are also included.

Possible changes in administrative activities were difficult to identify. The interviewees' opinion was adopted, i.e. that the current administrative work for subcontractors is nearly the same as the additional administrative work caused by additional own couriers. However, this is valid only for these areas analyzed in this study. For other areas such as in northern Finland the impact would be significant. The current administrative work, which addresses subcontractors, consists of the checking of invoices, monthly meetings and training organization.

DHL's own couriers form teams and each team has a lead courier who is responsible for the administration of daily arrangements. Therefore an increase in the number of own couriers causes little additional administrative work. Due to the nature of the DHL's service, a great deal of operations remain similar regardless as to whether the delivery activities are performed by a subcontractor or kept in-house and therefore the differences in administrative costs are insignificant.

Information technology

The level of information technology is analyzed as follows: a cellular phone (20%), ula (20%), RDA (50%), other communication system (30%), and a barcode reader (30%). An ideal combination includes a cellular phone, RDA and a barcode reader. For this analysis that level of information technology is included, which is currently accepted for a subcontractor

alternative. The RDA communication system is used by DHL. It allows on-line shipment information and informs couriers of pick-up orders.

At the moment only DHL's own vehicles and a few of one subcontractor's vehicles are equipped with 100% information technology. Investments in information technology could also be carried out for subcontractors' vehicles. These investments and their effects on the organization, besides the service effect, are not included in this analysis. The ability of increasing service level of subcontractors through these investments is acknowledged in the section, which details areas for improvements.

Customer Service

The customer satisfaction survey is one method of collecting customer feedback and it would be carried out in the same way as present even if there were more own couriers. Currently own couriers do not deliver additional customer feedback, although as was addressed in the previous chapter, the amount of customer contacts with couriers each day is significant. However, if there were more DHL own couriers it would be easier to build up a system for collecting customer feedback information from them.

If the number of vehicles used is the same in both alternatives there is no change in *delivery speed.* If there is no difference in the number of couriers in each alternative, it is not presented in the analysis table. *The recruitment criterion* is used for assessing the differences between own couriers and subcontractors. This is analyzed as percentage of the same factors regarded as important for recruitment at each subcontractor as at DHL.

The general knowledge of a subcontractor's courier is not as high as of DHL's own courier since a part of the knowledge derives from understanding the ways of action at DHL. Delivering whole day DHL's shipments increases the general knowledge of a courier, although s/he works for a subcontractor. The realization of *image* in each alternative is included in the analysis and it is measured as percentage of all couriers and vehicles in DHL's colors. If there is a difference in the number of couriers or vehicles between the alternatives, the actual number of each is presented.

As was argued in the previous chapter the *flexibility* in services derives from various components. In this analysis the number of vehicles in use is addressed, which measures the flexibility in deliveries for each alternative. In addition the ability to increase capacity and the service time are included in the analysis. The evaluation of these is relevant only for certain areas and it is addressed as a discrete factor.

7.2 Analysis by Geographical Area

This section presents the analysis for the most significant geographical areas in relation to the shipment volumes in the area (Table 6-3). The analysis is carried out for the Helsinki and Espoo stations and the Tampere, Jyväskylä and Turku areas. These areas account together for 85% of all deliveries. All areas in Finland could not be analyzed due to insufficient information of the shipment distribution in particular areas, which made it impossible to define the need for DHL's own couriers in an area. In remote areas also the service window is so narrow (1-3 hours) that it becomes a barrier for having own couriers in the area.

7.2.1 The Helsinki and Espoo Stations

The Helsinki station is divided for this analysis into five smaller areas, which follow geographical differences. The Espoo station is diveded into two areas. Namely one for the city area and another for longer routes.

The Helsinki station has 14 of its own couriers and the Espoo station has three of its own couriers. Also in both stations there are several subcontractors delivering whole day DHL's shipments. From these three are owner-drivers who operate for the Helsinki station. Very good experiences has been made with them, they are also dedicated to specific customers and therefore their operations are not included in the analysis. In the areas 3 and 4 in the Helsinki station are currently subcontractor's vehicles in use, which operate only for a couple of hours due to a narrow service window in the area. In other areas couriers operate on a whole day basis. A detailed analysis for these areas is presented in the Appendix 4. Here only a conclusion of each area is reviewed and summaries of those analysis tables are used.

In the cost analysis differences exist between the alternatives. In general the subcontractor alternative is favorable from the cost perspective to all areas within Helsinki and Espoo stations. However, except areas 3 and 4 the cost difference is marginal (2-10%). Also variability of cost need to be considered since except areas 3 and 4 the cost structure is fixed for both alternatives. In areas 3 and 4 a part of the cost for a subcontractor alternative varies according to the amount of shipments in the area and diminishes the total cost for a year and decreases the risk when compared with an in-house alternative.

The results of the qualitative analyses are summarized in the following tables. Tables 7-1 and 7-2 present the total service indexes for the Helsinki and Espoo stations.

Table 7-1 The Helsinki Station

	In-house	Subcontractor
Area 1	99 %	93 %
Area 2	99 %	74 %
Area 3	99 %	69 %
Area 4	99 %	78 %
Area 5	99 %	78 %

Table 7-2 The Espoo Station

	In-house	Subcontractor
Area 1	99 %	93 %
Area 2	99 %	78 %

In the qualitative analysis the differences are significant since the service level for a subcontractor alternative is lower for each area than for an in-house alternative. In those areas where a subcontractor operates full-time for DHL the difference is not as large as for those areas where part-time subcontractors are used. It was agreed that the same amount of vehicles is needed for these areas for an in-house alternative, as is currently used by a subcontractor and thus, no differences in delivery speed exist. Otherwise problems in achieving the deliveries could exist.

In general the difference in service level is derived from differences in characteristics of couriers (general knowledge and recruitment criteria) and from differences in information technology. Investments in information technology are already done in the Helsinki and Espoo areas 1 and therefore, the level of information technology for both alternatives is the same.

According to the analysis results, it is preferable to perform the areas 1,2 and 5 and the Espoo station in-house and to continue subcontracting for areas 3 and 4. This result is strongly

motivated by the difference in service levels. However, this situation may change in the future. Possible changes may occur in areas 2 in both stations since they include longer distances. If the shipment volumes increase considerably in areas where the service window is narrow, it results in a need for part-time couriers and is in favor of a subcontractor alternative. However, the situation for line-hauls to those areas is not supposed to change.

7.2.2 The Tampere Area

In the previous chapter it was argued that for the outsourcing analysis all services performed currently by one subcontractor have to be analyzed at one time. This is the situation for the Tampere area and thus, the differences between areas within the Tampere area not considered. The Tampere area includes all neighborhood areas and is therefore wide.

Shipment flows to the Tampere area are managed through the gateway at Tampere-Pirkkala airport. Therefore the service window in the area is relatively large (between 9 and 11 hours) and creates a positive environment for both alternatives, since the service window is no barrier to an in-house alternative. The Tampere area is divided into two smaller areas. The first one includes the city and neighborhood areas and the second one includes line-hauls operated from the gateway in Tampere. Tables 7-3 and 7-4 present the cost and qualitative analysis conducted for the Tampere area.

Table 7-3 The Tampere station area 1

	In-house	Subcontractor
Cost	2 700 000	1 620 000
Overhead commission	-	130 000
Variability of cost	-	40 %
Delivery speed	80 %	100 %
Information technology	100 %	80 %
Recruitment criteria	100 %	90 %
General knowledge	90 %	60 %
Number of drivers	10	30
Image presented by couriers	100 %	30 %
Number of vehicles	10	20
Image presented by vehicles	100 %	45 %
Ability to increase capacity	No	Yes
Service time	8-16	7.30-18
Service Index	**84 %**	**81 %**

Table 7-4 The Tampere station area 2

	In-house	Subcontractor
Cost	2 090 000	1 880 000
Variability of cost	-	-
Delivery speed	100 %	100 %
Information technology	100 %	70 %
Recruitment criteria	100 %	90 %
General knowledge	90 %	70 %
Image presented by couriers	100 %	100 %
Image presented by vehicles	100 %	90 %
Service Index	**99 %**	**86 %**

In the cost analysis a significant difference between the alternatives exist, which is in favor of a subcontractor alternative and is for the area 1 near 70% and for area 2 10%. The Tampere area is scattered and the shipment volumes are relatively high in the central area only, which creates a need for a high number of vehicles and thus results in a large cost difference between the alternatives. In area 2 the cost difference is smaller than for area 1. These activities require a courier to work full-time and therefore the cost difference is not substantial. But these activities have to be considered together and the decision has to be the same for both areas. The variable cost basis for 40% of the total cost is also favorable to the subcontractors alternative, since it adjusts to changes in delivery demand.

The qualitative analysis shows that delivery speed for the in-house alternative for area 1 is somewhat lower than for the outsourcing alternative. The difference derives from a smaller number of vehicles in use. Flexibility is higher for the subcontractor alternative since it employs a larger number of vehicles and has a longer service time. Other differences in the qualitative analysis are accounted from differences in couriers (recruitment criteria and general knowledge) and in the use of information technology, which both are in favor of an in-house alternative.

Although the subcontractor receives an additional commission the difference in cost is so significant that it is not favorable to an in-house solution. When the shipment volumes further increase in the area, the result may change. With the amount of vehicles as considered here it could be possible to deliver a larger amount of shipments. However, the shipment volume

should at least double so that the expenditure is the same, and for that amount of shipments additional vehicles for an in-house alternative is needed. Thus, the cost difference may decrease as the shipment volumes increase but it seems to still result in a favor of a subcontractor alternative.

7.2.3 The Jyväskylä Area

Shipment flows to the Jyväskylä area are managed through the gateway at Tampere-Pirkkala airport. As for the Tampere area the analysis is made with regard to all operations performed currently by the subcontractor. The service window for the area is between 4 and 7 hours. Table 7-5 presents the results of cost and qualitative analyses for the area.

Table 7-5 The Jyväskylä area

	In-house	Subcontractor
Cost	1 080 000	480 000
Overhead commission	-	90 000
Overhead local operations	-	10000
Variability of cost	-	80 %
Delivery speed	80 %	100 %
Information technology	100 %	50 %
Recruitment criteria	100 %	90 %
General knowledge	90 %	70 %
Number of drivers	4	16
Image presented by couriers	100 %	25 %
Number of vehicles	4	16
Image presented by vehicles	100 %	25 %
Ability to increase capacity	No	Yes (4-5)
Service time	8-16	7.30-17
Service Index	**84 %**	**71 %**

The cost analysis shows a substantial difference between in-house and outsourcing alternatives, which is in favor of the subcontractor alternative. The geographical area of Jyväskylä is scattered and therefore requires a relatively high number of vehicles. Also the relatively small service window in the area increases the need for vehicles. In addition the cost for subcontractor's deliveries is mostly based on a variable basis and favors the subcontractor alternative, since it decreases risk and the total annual cost.

The qualitative analysis presents differences in service level, which are in favor of an in-house alternative. The differences result from information technology and couriers. Delivery speed for the in-house alternative is somewhat lower than for the subcontractor alternative and derives from a lower number of vehicles in use. It also increases the level of risk in case of delays in flight schedules since it does not allow capacity adjustments. Flexibility is considerably higher for the subcontractor alternative since it employs a larger number of vehicles and has a longer service time. The subcontractor has also the possibility to increase capacity on short notice.

According to this analysis, it is preferable to continue with subcontracting in the Jyväskylä area. In addition, areas for improving the service level of the subcontractors should be investigated. A future increase in the shipment volumes should not change the cost results. The narrow service window and scattered geographical area will accordingly require a higher amount of vehicles in an in-house alternative and a substantial cost difference is assumed to exist.

7.2.4 The Turku Area

The Turku area includes the city of Turku and the neighborhood areas. All activities performed by the subcontractor are included in the analysis. The service window in the area is between 4,5 and 6,5 hours. The analysis carried out for the Turku area is presented in Table 7-6.

Table 7-6 The Turku area

	In-house	Subcontractor
Cost	1 260 000	950 000
Overhead local operations	260 000	120 000
Variability of cost	-	100%
Delivery speed	80 %	100 %
Information technology	100 %	70 %
Recruitment criteria	100 %	90 %
General knowledge	90 %	70 %
Number of drivers	5	14
Image presented by couriers	100 %	40 %
Number of vehicles	5	14
Image presented by vehicles	100 %	30 %
Ability to increase capacity	No	Yes (2)
Service time	8-16	7-17
Service Index	**84%**	**78 %**

The cost analysis shows a difference in cost, which is not as significant as in Jyväskylä. This results from the fact that the geographical area of Turku is not as scattered as in Jyväskylä. However, the cost difference (40%) is still substantial and favors of the subcontractor alternative, the overhead in local operation increases it further. The variability of costs further supports the subcontractor alternative.

In the qualitative analysis differences derive from information technology and couriers. Flexibility and delivery speed are higher for the subcontractor alternative since it employs a higher number of vehicles, has the ability to increase capacity and has longer service time.

Since the difference in cost is substantial and the accrual basis is variable for subcontracting, it is preferable to continue with subcontracting. However, areas for improving the service level of subcontractor should be investigated. A relatively narrow service window increases the level of risk in an in-house alternative, since in case of delays in flight schedules it does not allow capacity adjustments.

7.3 Relationship Analysis

Here the analysis regarding the current relationships with subcontractors is carried out. There are no significant differences in the relationships between the major subcontractors and therefore this analysis includes all of them. The analysis is carried out in order to identify areas for improvement.

7.3.1 Continuity of the Relationships

DHL is clearly the biggest client for all subcontractors, which is favors of long-term commitment and lower level of risk in the relationship. Almost all subcontractors have co-operated with DHL for a long time and have adjusted their own operations according to the needs of DHL, which benefits DHL. They also have created different alternatives for operations in order to be able to respond to the operational changes in DHL's operations. They are regarded as being quite flexible in their operations, which creates a favorable environment for changes.

There is a certain risk for DHL's image when subcontractors use DHL's logo in their vehicles and clothes, because DHL cannot continuously control their behavior. If a subcontractor uses its vehicles with DHL's logo for other purposes than delivering DHL's shipments, DHL may be associated with the operations of that subcontractor. The use of DHL's logo by subcontractors is not risky if it is controlled through a contractual relationship or if it can be base on trust in the relationship. In those areas where shipment volumes are very thin, it is considered to be of no use to have a subcontractor's vehicles in DHL's colors since they would mainly operate for other purposes than delivering DHL's shipments.

7.3.2 Areas of Improvement in the Relationships

Long-term planning with subcontractors concerning e.g. investments should be carried out in order to create closer relationships. It would also increase the level of commitment in the relationship. Exploration should be carried out as to when investments in information technology could be realized to improve the service level of subcontractors. All subcontractors take a positive view of improvements and are ready to invest time for training, which creates a positive environment for these.

In order to improve the relationship exact contracts should be made that would present precisely what is expected from subcontractors and how this will be monitored. Exact contracts would clarify problematic situations regarding responsibility and possible mistakes and thus, increase the level of commitment and effectiveness of the relationship. Because stations bear the responsibility for a subcontractor relationship, it should be ensured that all subcontractor relationships are treated alike. This may require a centralized solution. More training is essential for improving the general knowledge of subcontractors' couriers. Training would also improve the knowledge of service processes.

Information exchange should be improved and secured so that subcontractors receive the latest instructions. Information exchange of coming changes would improve their realization since the subcontractors could react in time to the coming changes. Subcontractors would like to meet sales people from DHL more often as well as exchange information and opinions.

7.4 Managerial Recommendations

Noteworthy for the outsourcing decision is the realization of the delivery network in each alternative. When both alternatives require a full-time driver and vehicle there is little difference in costs between the alternatives. However, surprisingly the cost analysis indicated that a subcontractor alternative is superior to the in-house alternative for all areas. This also applies to the areas currently performed in-house. For these areas and other areas where a subcontractor also alternatively employs full-time couriers, the difference in cost is between 3-10% in favor of a subcontractor alternative. The difference in cost is assumed to derive from two sources. Firstly, it results from subcontractors' ability to use vehicles for other purposes during evenings and weekends. Secondly, it results from a lower wage level from subcontractors.

However, if a subcontractor uses a large number of vehicles for the distribution activities, it results in a substantial cost benefit in comparison to an in-house alternative. This is generally associated with a narrow service window in the area. The difference in cost is 30-70% in favor of a subcontractor alternative. This results generally from economies of scale since the subcontractors are able to combine the product flows of several clients and thus, is more favorable solution for those areas.

Variable cost basis follows the actual shipment volumes and therefore decreases the risk associated with demand changes. The risk level increases when the service window decreases, since a narrow service window is easily exposed to interruptions. A lower level of flexibility in an in-house alternative may result in delivery problems because capacity adjustments are not possible. A higher number of vehicles in a subcontractor alternative decreases the risk associated with a narrow service window.

The requirements for DHL's shipments differ from those of subcontractors' own even though they all offer express services. The qualitative aspects are in favor of an in-house alternative in all areas analyzed, although the differences are not significant in all areas. Differences in qualitative analysis derive mainly from information technology and couriers. If subcontracting continues, possibilities for improvements in these areas should be investigated.

Since the difference in cost is significant for the Tampere, Jyväskylä and Turku areas, it is preferable to continue subcontracting. However, possibilities for improvements in the service level of the subcontractors should be investigated. In principle, the routes operated form the gateways have the most potential for an in-house alternative. In those areas in the Helsinki and Espoo station where the cost difference between alternatives is insignificant an in-house alternative is preferable. This is due to a higher service level in the in-house operations.

More information should be gained regarding two areas. Firstly, the customer satisfaction specific for each distinctive geographical area should be reviewed and secondly, more precise information of the shipment distribution is needed. This information allows a more detailed analysis for the future outsourcing decisions.

The geographical challenges in Finland have an impact on the outsourcing decisions. It is obvious that in remote areas subcontracting is the only relevant alternative, because of the thin shipment volumes. However, it is important that the organization recognizes the possibility to change to the in-house alternative and reviews the service level currently derived from a subcontractor alternative. This analysis provides information of both the cost and qualitative aspects to the decision. To sum up, the positive and negative impacts of outsourcing for DHL are presented in Figure 7-1.

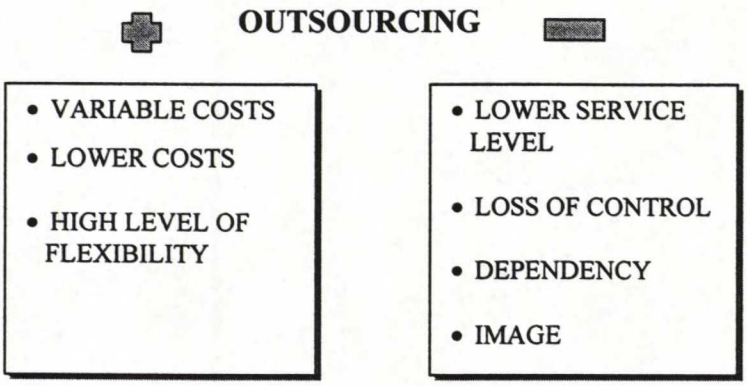

Figure 7-1 Impacts of Outsourcing at DHL

On the contrary, the most important positive effects of performing the delivery activities in-house include more control, higher service level, monitoring actual costs and image, control of training and recruitment.

8 DISCUSSION

The purpose of this study was to explore, whether a firm should outsource its logistics services or not. The objective was to gain a better understanding of decision-making for logistics outsourcing. This in order to complement the previous research on logistics outsourcing, which has put little emphasis on the actual decision making of an individual firm. This study sought to determine the stages of decision-making and the factors to be included in the comparative analysis of alternatives. These factors were addressed in the theoretical part of the study.

Logistics outsourcing is contingent on a wide range of factors. This results in the need to conduct an in-depth study and therefore a single case study method was selected. The case firm is an international express service provider. The delivery processes of the case firm were analyzed according to the theoretical framework.

This study was motivated by a need for more information regarding outsourcing decision in the case firm. At the moment the case firm uses both own couriers and subcontractors. The empirical part of the study investigated which areas were further more preferable to outsource and which areas were preferable to keep in-house. The empirical part of the study followed the theoretical framework. The case study began by an assessment of the current logistics configuration in the case firm. It followed by a definition of the core competencies of the firm and an analysis of the relation of logistics processes to the core competencies of the firm. The next step in the study was setting essential requirements for logistics, which addressed the factors to be included in the comparative analysis of the alternatives. The actual analysis included both financial and qualitative factors and was conducted for each geographical area.

Overall, the study findings suggest that the current situation regarding logistics outsourcing in the case firm is not quite optimal. Surprisingly, it was found in the cost analysis that the outsourcing alternative was superior in all areas analyzed. On the contrary, in the qualitative analysis it was found that considerable differences exist in service levels between the alternatives. Finally, the study findings indicate that the case study firm should change its way of action regarding outsourcing in certain geographical areas.

Although it was beyond the scope of this study to examine the relationships with service providers, the situation of the case firm and its relationships with current service providers was analyzed. This was carried out in order to identify the areas for improvement. Overall, a high level of trust and commitment characterizes the relationships. Based on the analysis carried out potential improvement areas of the relationships were identified. These findings may contribute measures in order to improve the service level of the subcontractors.

At the beginning of the study an assumption was made that the rationale behind the relationships of two providers is similar to those behind the alliances of shippers and service providers. The theoretical framework was built based on this assumption and since it reached acceptance in the case study firm, it seems to support the assumption. Furthermore, the general impacts of outsourcing in the case study firm are similar to those found in literature.

Limitations to the Study and Directions for Future Research

The present study only investigated one case firm and therefore it is not clear how far the framework can be generally applied. The framework gained acceptance in the case firm studied, which seems to indicate that it is suitable for use in decision-making.

There are two major directions for future research. First, in order to test the usefulness of the framework, it is necessary to further apply the framework to other case studies. In general, future research should examine more carefully the critical issue of decision-making in logistics outsourcing. And second, since at present very few studies have dealt with the producers of third-party logistics services, it would be interesting to further investigate the role of outsourcing at service providers. In addition, from the relationship point of view of the relationship, one possible area for future research could be the investigation of the benefits for both parties (third and fourth) of the relationship.

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INTERVIEWS

Preliminary Phase

Aulio, Heikki, DHL, Operations Support, Tampere, 7.10.1998

Haroma, Jukka, Lähettiykkönen, General Director, Turku, 6.10.1998

Lysmä, Petri, DHL, District Support, Vantaa, 28.10.1998

Mäkinen, Jori, DHL, Station Manager, Tampere, 7.10.1998

Penttinen, Mikko, DHL, Station Manager, Turku, 6.10.1998

Saastamoinen, Mikko, DHL, Operations Support Manager, Vantaa, 15.9.1998

Subcontractors

Haroma, Jukka, Lähettiykkönen, General Manager, Turku, 11.1.1999

Kosonen, Harri, Cargo Express, Marketing Manager, Helsinki, 12.1.1999

Louhesto, Juha, Keski-Suomen Tavaralähetit, General Manager, Jyväskylä, 18.1.1999

Majuri, Jorma, Lähettipirkka, General Manager, Tampere, 19.1.1999

Palm, Björn, Backman-Trummer, Managing Director, Vaasa, 20.1.1999

Reini, Tero, Backman-Trummer, Sales, Vaasa, 20.1.1999

DHL International Oy

Ignatius, Tapio, DHL, Operations Manager, Vantaa, 21.1.1999

Kaihari, Ray, DHL, North District Manager, Vantaa, 1.2.1999

Lindahl, Henrik, DHL, Commercial Manager, Vantaa, 1.2.1999

Massinen, Niina, DHL, Customer Service Agent, Vantaa, 1.2.1999

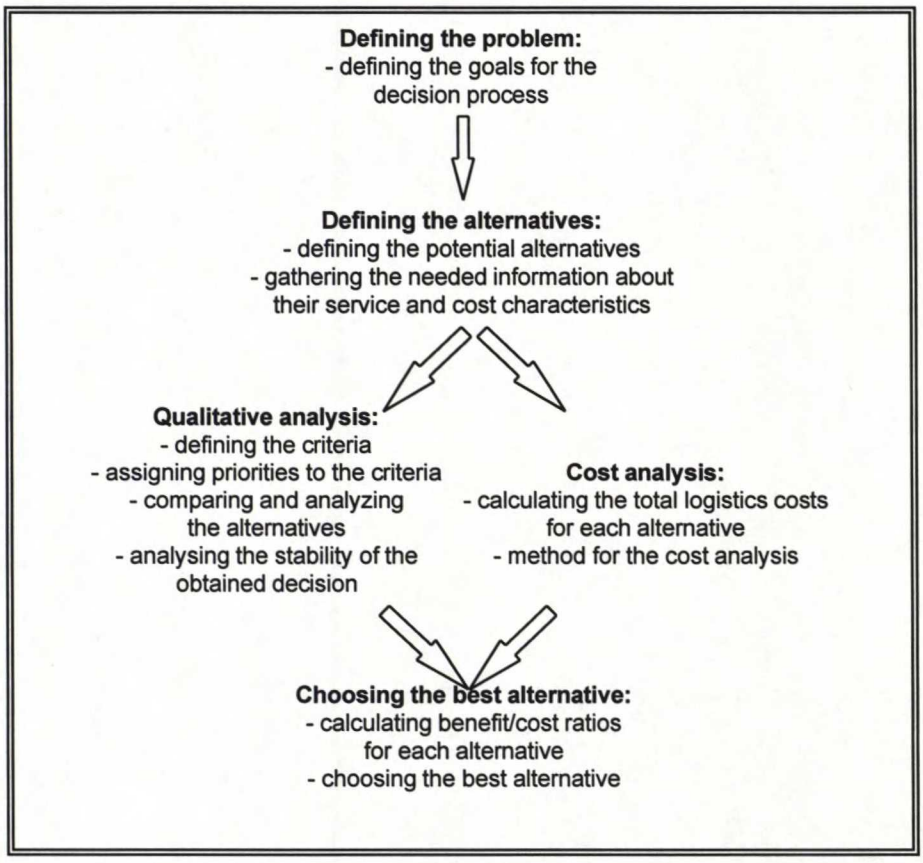
Munkki, Petri, DHL, Marketing Manager, Vantaa, 28.1.1999

Penttinen, Merja, DHL, Customer Service Supervisor, Vantaa, 4.2.1999

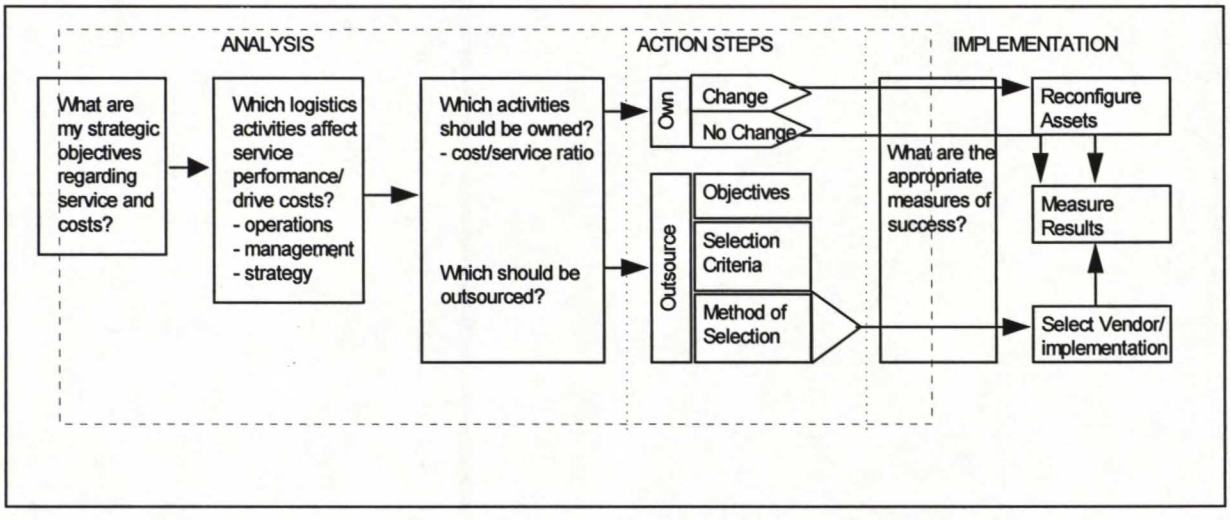
Somervuori, Outi, DHL, Business Analyst, Vantaa, 10.2.1999

Österberg, Benita, DHL, Station Manager, Vantaa, 28.1.1999

APPENDIX 1



Source: Korpela & Tuominen (1994)



Source: Arthur Andersen cited by Bowman (1997)

APPENDIX 2

INTERVIEW FORM Subcontractors

Background information

- capacity, number of vehicles and drivers
- geographical area of operations
- the turnover, DHL's share on it
- What services do you perform for DHL?
- What is the level of information technology in your vehicles?

Personnel

- What criteria do you use in recruitment?
- How much training is carried out each year?

1

Customer Service

- How do you monitor your operations?
- What are the most important factors in customer service?

Flexibility

- What is your service time?
- Can you increase your capacity on short notice? How much?

Image

- How many vehicles are in colors of DHL?
- What kind of clothes do your drivers use?
- How many driver use DHL's clothes?

1

Continuity

- What future plans do you have?
- Are you willing to cooperate in development projects with DHL, which require investments and training?
- What is the competitive situation in your area?
- Experiences from relationship with DHL
- Development areas in relationship

APPENDIX 3

INTERVIEW FORM DHL

Strategy and service

- What is DHL's strategy?
- What are the components of the service offering?
- What are the critical competitive elements in the industry?
- What are the important operative activities with regard to the strategy?

Operations in Finland

- What are the geographical differences in Finland?
- What would be a good division for the analysis?

Core competence

- What are the core competences of DHL?
- What is the role of country operations for the core competences?

Essential requirements for delivery activities

- What are the critical parts of customer service?
- What requirements are set to the activities?
- How are the activities monitored?
- Are there reporting requirements for subcontractors?
- What is flexibility in delivery activities? Why is it needed?
- What are the minimum requirements for shipment information?

Image

- What are the components of DHL's image?
- What means DHL use to strengthen its image?
- What is the role of couriers and vehicles to the overall image?

Customer feedback

- What surveys are regularly carried out?
- How are the results used?
- What are the components of customer satisfaction?
- Are couriers used for delivering customer feedback/information?
- What is the importance of different marketing communication methods to the overall image?

Outsourcing

- What would change, if subcontractors performed all activities?
- What would change, if all activities were carried out in-house?
- What are the positive and negative effects of outsourcing?

Relationships with subcontractors

- What experiences exist from relationships with subcontractors?
- How could the co-operation be developed?
- How much time is used for current relationships with subcontractors?

APPENDIX 4

The Helsinki Station: Area 1

	In-house	Subcontractor
Cost	4 190 000	4 025 000
Variability of cost	-	-
Delivery speed	100%	100%
Information technology	100%	100%
Recruitment criteria	100%	70%
General knowledge	90%	80%
Image presented by couriers	100%	100%
Image presented by vehicles	100%	90%
Service Index	**99%**	**93%**

The Helsinki Station: Area 2

	In-house	Subcontractor
Cost	380 000	346 000
Variability of cost	-	-
Delivery speed	100%	100%
Information technology	100%	50%
Recruitment criteria	100%	70%
General knowledge	90%	80%
Image presented by couriers	100%	100%
Image presented by vehicles	100%	90%
Service Index	**93%**	**74%**

The Helsinki Station: Area 3

	In-house	Subcontractor
Cost	1 117 000	727 000
Variability of cost	-	50%
Overhead local operations	-	6 700
Delivery speed	100%	100%
Information technology	100%	50%
Recruitment criteria	100%	70%
General knowledge	90%	70%
Image presented by couriers	100%	25%
Image presented by vehicles	100%	25%
Service Index	**99%**	**69%**

The Helsinki Station: Area 4

	In-house	Subcontractor
Cost	1 425 000	883 000
Variability of cost	-	60%
Overhead local operations	-	13 500
Delivery speed	100%	100%
Information technology	100%	50%
Recruitment criteria	100%	70%
General knowledge	90%	70%
Image presented by couriers	100%	20%
Image presented by vehicles	100%	20%
Service Index	**99%**	**78%**

The Helsinki Station: Area 5

	In-house	Subcontractor
Cost	865 000	798 000
Variability of cost	-	-
Delivery speed	100%	100%
Information technology	100%	50%
Recruitment criteria	100%	70%
General knowledge	90%	80%
Image presented by couriers	100%	100%
Image presented by vehicles	100%	90%
Service Index	**99%**	**78%**

The Espoo Station: Area 1

	In-house	Subcontractor
Cost	1 362 000	1 314 000
Variability of cost	-	-
Delivery speed	100%	100%
Information technology	100%	100%
Recruitment criteria	100%	70%
General knowledge	90%	80%
Image presented by couriers	100%	100%
Image presented by vehicles	100%	90%
Service Index	**99%**	**93%**

The Espoo Station: Area 2

	In-house	Subcontractor
Cost	947 000	869 000
Variability of cost	-	-
Delivery speed	100%	100%
Information technology	100%	50%
Recruitment criteria	100%	70%
General knowledge	90%	80%
Image presented by couriers	100%	100%
Image presented by vehicles	100%	90%
Service Index	**99%**	**78%**